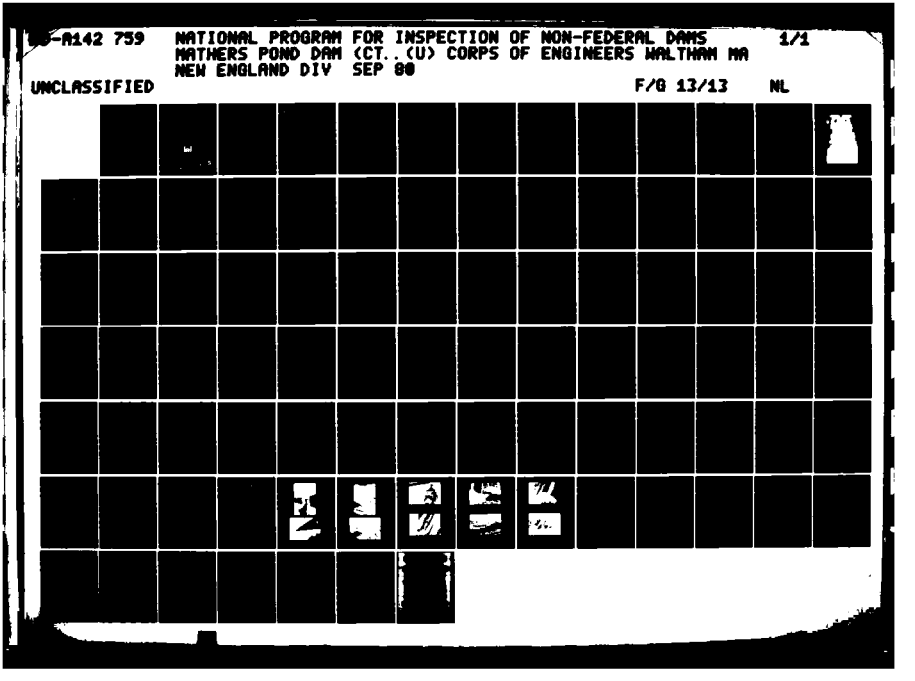

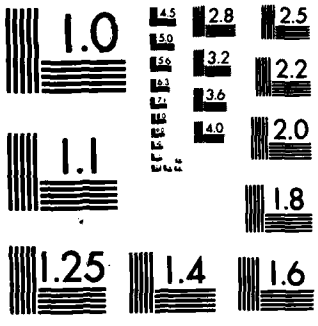

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CONNECTICUT COASTAL AREA

DARIEN, CONNECTICUT

MATHERS POND DAM
CT 00054

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

SEPTEMBER 1980

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE	READ INSTRUCTIONS BEFORE COMPLETING FORM
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9. PERFORMING ORGANIZATION NAME AND ADDRESS	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
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Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Conn. Coastal Area
Darien, Conn.
Mathers Pond Dam

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Mathers Pond Dam is concrete gravity and an earth embankment approx. 280 ft. long and 18 ft. high. The concrete portion of the dam is 170 ft. long and is 2 ft. wide at the top and 10.5 ft. wide at the bottom. It is keyed into a 13 ft. wide footing of varying depth. The earthen portion of the dam has a concrete core wall that extends a maximum 9 ft. into natural ground. The embankment is 2 ft. hihger that the concrete section. The principal spillway is located approx. at the center of the dam and is 5 ft. long and 1 ft. deep. However, the entire concrete portion is considered an emergency spillway.

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF:

NEDED

DEC 19 1980

Honorable Ella T. Grasso
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

Dear Governor Grasso:

Inclosed is a copy of the Mathers Pond Dam (CT-00054) Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Protection, the cooperating agency for the State of Connecticut. In addition, a copy of the report has also been furnished the owner, Mr. David R. Arnold et al, Darien, Conn.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Protection for your cooperation in carrying out this program.

Sincerely,

WILLIAM E. HODGSON, JR.
Colonel, Corps of Engineers
Acting Division Engineer

Incl
As stated

MATHERS POND DAM

CT 00054

CONNECTICUT COASTAL AREA

DARIEN, CONNECTICUT

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PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM

PHASE I INSPECTION REPORT

Identification Number:	CT 00054
Name:	Mathers Pond Dam
Town:	Darien
County and State:	Fairfield County, Connecticut
Stream:	Tributary to Goodwives River
Date of Inspection:	May 30, 1980

BRIEF ASSESSMENT

Mathers Pond Dam is concrete gravity and an earth embankment approximately 280 feet long and 18 feet high. The concrete portion of the dam is 170 feet long and is 2 feet wide at the top and 10.5 feet wide at the bottom. It is keyed into a 13-foot wide footing of varying depth. The earthen portion of the dam has a concrete core wall that extends a maximum 9 feet into natural ground. The embankment is 2 feet higher than the concrete section. The principal spillway is located approximately at the center of the dam and is 5 feet long and 1 foot deep. However, the entire concrete portion is considered an emergency spillway. A 12-inch low level discharge pipe passes through the base of the dam and is located below the spillway. The control for this discharge pipe is on the upstream face. The drainage area is 0.5 square miles and the pond has 100 acre-feet of available storage.

The assessment of the dam is based on the visual inspection, available drawings, past operational performance and hydraulic/hydrologic computations. The dam is judged to be in fair condition with several areas that require attention. These areas include seepage through the dam and at the toe of the dam, vegetation on the embankments and along the toe of the dam and the non-operating status of the discharge pipe.

The dam is classified as small and has a low hazard potential in accordance with guidelines established by the Corps of Engineers. Spillway adequacy analysis was made using a 100-year test flood. Peak inflow to the reservoir is 157 cfs; outflow is attenuated by storage to a peak rate of 145 cfs. The dam is not overtopped by the test flood; spillway capacity with pool at top of dam elevation is 1,496 cfs or approximatley 10 times the routed test flood outflow.

It is recommended that the owner engage the services of a qualified registered engineer experienced in the design of dams to investigate the seepage through the dam and the toe; the potential erosion due to water flowing over the emergency spillway portion of the dam; the removal of trees on the downstream embankment and along the toe of the dam; the integrity of the gunite surface and the concrete in the interior of the dam. It is also recommended that the owner clear the downstream channel of debris; maintain the control gate in an operating condition; repair all cracked concrete; replace missing riprap along the toe; and initiate an annual technical inspection.

The owner should implement the recommendations and remedial measures described above and in greater detail in Section 7 within one year after receipt of this Phase I Inspection Report.

Joseph F. Merluzzo
Connecticut P.E. #7639
Project Manager

Gary J. Giroux
Connecticut P.E. #11477
Project Engineer

This Phase I Inspection Report on Mathers Pond Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

ARAMAST MAHTESIAN, MEMBER
Geotechnical Engineering Branch
Engineering Division

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

RICHARD DIBUONO, CHAIRMAN
Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Inspections. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Inspection is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigations and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Inspection; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

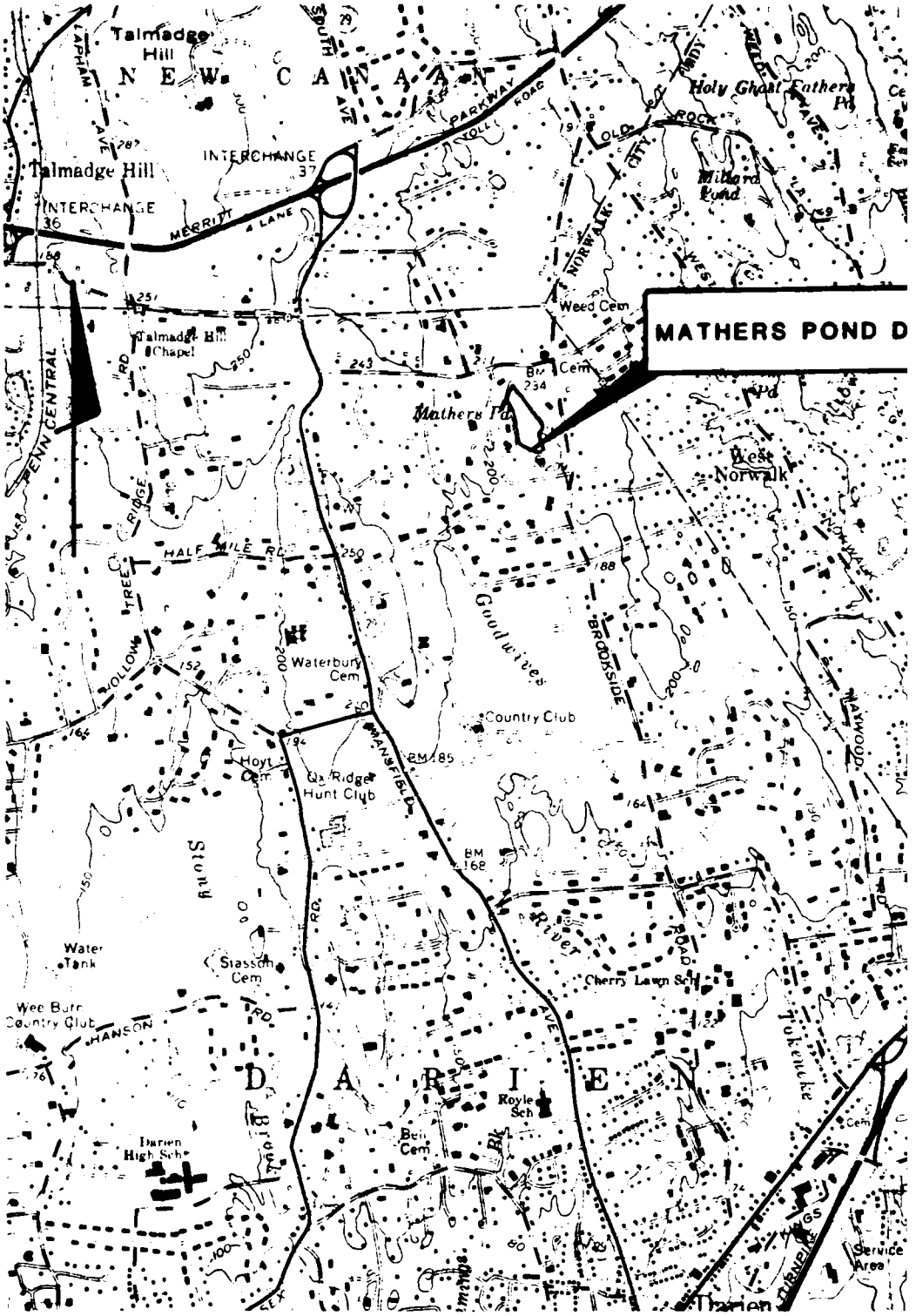
It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I Inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established guidelines, the Spillway Test Flood is based on the estimated Probable Maximum Flood for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and variety of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies considering the size of the dam, its general condition and the downstream damage potential.

The Phase I Inspection does not include an assessment of the need for fences, gates, "no trespassing" signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with Occupational Safety and Health Administration's (OSHA) rules and regulations is also excluded.

TABLE OF CONTENTS

MATHERS POND DAM



QUADRANGLE: **NORWALK SOUTH, CT**

US ARMY, CORPS OF ENGINEERS
NEW ENGLAND DIVISION
WALTHAM, MASS.

SCALE IN FEE
2000' 0 2
1" = 2000'

LOCATION

PHASE I INSPECTION REPORT

MATHERS POND DAM CT 00054

SECTION 1 - PROJECT INFORMATION

1.1 General

a. Authority - Public Law 92-367, August 8, 1972 authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Storch Engineers has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed were issued to Storch Engineers under a letter of March 6, 1980 from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW33-80-C-0035 has been assigned by the Corps of Engineers for this work.

b. Purpose of Inspection -

(1) Perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.

(2) Encourage and prepare the states to initiate quickly effective dam safety programs for non-Federal dams.

(3) To update, verify and complete the National Inventory of Dams.

1.2 Description of Project

a. Location - Mathers Pond Dam is located in the northeastern corner of the Town of Darien, Fairfield County, Connecticut approximately 3/4 mile south of the Merritt Parkway (U.S. Route 15) and 1/3 mile south of the intersection of the Darien, Norwalk and New Canaan townlines. The coordinates of the dam are approximately 41°-06.5' north latitude and 73°-28.5' west longitude. The dam is located on a tributary of the Goodwives River and is located approximately 3,000 feet upstream from the confluence with that river.

b. Description of Dam and Appurtenances - Mathers Pond Dam is a concrete gravity and earth embankment dam approximately 280 feet long and 18 feet high.

The concrete gravity portion of the dam is approximately 170 feet long and spans the deepest part of the valley. It is here that the dam is 18 feet high. The top width of the concrete portion is 2 feet and the bottom width is 10.5 feet. The whole structure is keyed into a 13-foot wide footing of varying depth. The entire downstream face of the concrete portion has been resurfaced with gunite.

The earthen embankment portion of the dam is raised 2 feet above the concrete section and has a concrete core wall that extends a maximum 9 feet into natural ground and is keyed into the concrete section.

The principal spillway is located approximately at the center of the dam in the concrete section. This spillway is 5 feet long and 1 foot deep. The entire concrete portion of the dam is an emergency spillway. A 12-inch low level discharge pipe is located below the principal spillway through the base of the dam. Control of the discharge pipe is by means of a gate valve on the upstream face.

c. Size Classification - Mathers Pond Dam has a maximum capacity of 32 acre-feet at the top of the dam and a maximum height of 18 feet. In accordance with the Recommended Guidelines for Safety Inspection of Dams established by the Corps of Engineers, the dam is classified as small (height less than 40 feet, storage less than 1,000 acre-feet).

d. Hazard Classification - Mathers Pond Dam is classified as having a low hazard potential. Failure of the dam with the water level at the top of the dam would result in the inundation of backyards that encroach the brook and damage several roadways, but should not affect any homes. The first floor sills of the homes in the impact area are at least 7 feet above streambed. Estimated flow and water depth just prior to failure (water level at the top of the dam) is 1,486 cfs at 3.8 feet and just after dam failure is 6,420 cfs at 5.4 feet.

e. Ownership - Mathers Pond Dam is owned by seven property owners that abut the pond. Any correspondence or personal contact should be addressed to:

Mr. David R. Arnold
63 Dorchester Road
Darien, Connecticut 06820
(203) 655-7222

or

Mr. Edward R. McPherson, Jr.
P.O. Box 1054
Darien, Connecticut 06820
(203) 655-0656

f. Operator - Operating personnel are under the direction of:

Mr. David R. Arnold
63 Dorchester Road
Darien, Connecticut 06820
(203) 655-7222

g. Purpose of Dam - The dam was constructed to impound Mathers Pond which is used for recreation.

h. Design and Construction History - Mathers Pond Dam was designed by Major William A. Welch, Chief Engineer of the Pallisades Interstate Parkway Commission in 1920. In 1921, the dam was constructed by local labor under supervision of Major Welch.

In 1938, leakage was discovered at the easterly end of dam and concrete was poured to seal it off. This work was done by the Paul Bacco Company under the supervision of Charles Rumpf, P.E. Also at this time, a raised shelf was placed along the downstream toe and the overflow section of the dam underwent modification.

In 1940, the pond was emptied, and an application of pneumatic mortar (gunite) was applied to the entire dam. The original 3' x 3' sluiceway was reduced to a 12-inch pipe opening. Guniting was done by Allied Pneumatic Company under supervision of Mr. Rumpf.

In late 1965, the existing guinte was removed; new mesh installed and a new application of gunite made to the downstream face and over the top of the dam for a distance to cover the horizontal joint created by weir modification. The pond was not dewatered at this time. Work was done by the E.L. Wagner Company under the supervision of Mr. Rumpf.

Subsequent to 1973, a riprap gutter 6 feet wide was placed below the concrete section of the dam. This is intended to protect the toe when water flows over the concrete section of the dam.

i. Normal Operating Procedures - Water level in Mathers Pond is uncontrolled. The gate is inoperable.

1.3 Pertinent Data

a. Drainage Area - The Mathers Pond drainage basin is located in the Towns of Darien and New Canaan, Connecticut and is oval in shape with a length of 5,500 feet and a width of 2,000 feet. The area of the drainage

basin is 240 acres (Appendix D -Plate 3). Less than 5 percent of the drainage basin is natural storage and more than 60 percent is developed. The remainder is woods or open space. The topography is rolling with elevations ranging from 270 (NGVD) in the northern section to 208 (NGVD) at the spillway crest.

b. Discharge at Damsite - There are no records available for discharge at the dam. All spillway capacities listed below are for the principal and emergency spillways.

(1)	Outlet works (conduit) size:	12 inches
	Invert elevation (feet above NGVD):	192
	Discharge Capacity at top of dam:	25 cfs
(2)	Maximum known flood at damsite: (Oct. 1955)	unknown
(3)	Ungated spillway capacity at top of dam:	1,496 cfs
	Elevation (NGVD):	210
(4)	Ungated spillway capacity at test	
	flood elevation:	145 cfs
	Elevation (NGVD):	208.45
(5)	Gated spillway capacity at normal pool	
	elevation:	N/A
	Elevation (NGVD):	N/A
(6)	Gated spillway capacity at test flood	
	elevation:	N/A
	Elevation:	N/A
(7)	Total Spillway capacity at test flood	
	elevation:	145 cfs
	Elevation (NGVD):	208.45
(8)	Total project discharge at top of dam:	1,521 cfs
	Elevation (NGVD):	210

(9)	Total project discharge at test flood elevation:	170 cfs
	Elevation (NGVD):	208.45
c.	Elevation (feet above NGVD)	
(1)	Streambed at toe of dam:	192
(2)	Bottom of cutoff:	unknown
(3)	Maximum tailwater:	193.8
(4)	Normal pool:	207
(5)	Full flood control pool:	N/A
(6)	Spillway crest (ungated):	207
(7)	Design surcharge (original design):	unknown
(8)	Top of dam:	210
(9)	Test flood surcharge:	208.45
d.	Reservoir (length in feet)	
(1)	Normal pool:	900
(2)	Flood control pool:	N/A
(3)	Spillway crest pool:	900
(4)	Top of dam:	910
(5)	Test flood pool:	900
e.	Storage (acre-feet)	
(1)	Normal pool:	15
(2)	Flood control pool:	N/A
(3)	Spillway crest pool:	15
(4)	Top of dam:	32
(5)	Test flood pool:	23

f.	Reservoir Surface (acres)		
	(1) Normal pool:		5.0
	(2) Flood control pool:		N/A
	(3) Spillway crest:		5.0
	(4) Test flood pool:		5.75
	(5) Top of dam:		6.0
	g. Dam		
	(1) Type:	Concrete gravity	earth embankment
	(2) Length:	170 feet	110 feet
	(3) Height:	18 feet	5 feet
	(4) Top width:	2 feet	4 feet
	(5) Side slopes:	1:2-downstream	2:1
	(6) Zoning:	none	unknown
	(7) Impervious Core:	N/A	concrete
	(8) Cutoff:	footing depth varies	maximum 9 feet below natural ground
	(9) Grout curtain:	unknown	unknown
	(10) Other:	N/A	N/A
	h. Diversion and Regulating Tunnel		N/A
	i. Spillway		
	(1) Type:		concrete broad crested
	(2) Length of weir:		170 feet
	(3) Crest elevation (without flashboard):		208
	(4) Gates:		N/A
	(5) U/S channel:		none

(6)	D/S channel:	riprapped channel
(7)	General:	N/A

j. Regulating Outlets

(1)	Invert elevation (NGVD):	192
(2)	Size:	12 inches
(3)	Description:	Cast iron pipe
(4)	Control Mechanism	Manually operated gate
(5)	Other:	Gate not operable

SECTION 2 - ENGINEERING DATA

2.1 Design Data

No design computations are available for this dam, however, the following drawings are available:

(a) Plans for concrete and core wall dams for the Honorable Stephen T. Mather, Darien, Connecticut - William A. Welch, Consulting Engineer, December, 1920 (Appendix B - Plate 1).

(b) Mather Pond Dam proposed repairs - Thomas E. Golden, Jr., P.E. - Drawings SK-1 and SK-2 (Appendix B - Report by Thomas E. Golden, Jr., P.E.).

2.2 Construction Data

The dam was constructed in 1921 by local labor under the direction of William A. Welch. There are no as-built records of the original construction.

In October, 1938, work was done by the Paul Bacco Company under the supervision of Charles Rumpf, P.E. The work done was essentially sealing a leak under the easterly end of the dam with concrete and modifications to the top of dam (overflow section). Records of this work and pictures are available at the Water Resources Unit of the Connecticut Department of Environmental Protection.

In 1940, the pond was emptied and an application of gunite was applied to the entire dam. Also, the original 3' x 3' sluicegate was replaced by a 12-inch diameter pipe. The guniting was done by the Allied Pneumatic Company under the direction of Charles Rumpf, P.E. Records and photos of this work are also available at the above location.

In late 1965, the existing gunite was removed; new mesh installed, and a new application of gunite made to the downstream face and over the top of the dam a distance to cover the horizontal joint created by weir modification. The pond was not dewatered at this time. Work was done by the E.L. Wagner Company under the supervision of Mr. Rumpf. Records are also available at the Connecticut Department of Environmental Protection.

Subsequent to 1973, a riprap gutter, 6 feet wide was placed below the concrete section of the dam. There are no records available for this work.

2.3 Operation Data

The pond is used for recreation and is not regulated because the gate does not operate. No operating records for this dam have been maintained.

2.4 Evaluation of Data

a. Availability - The information noted above is readily available from the files of the Water Resources Unit - Department of Environmental Protection, State of Connecticut and from the persons noted in Section 1.2.e.

b. Adequacy - The data made available along with the visual inspection, past performance history and hydraulic/hydrologic assumptions were adequate to assess the condition of the facility.

c. Validity - The field inspection revealed that the dam was constructed essentially as the data states, however, some of the information must be verified.

SECTION 3 - VISUAL INSPECTION

3.1 Findings

a. General - The visual inspection was conducted on May 30, 1980 by members of the engineering staff of Storch Engineers and D. Baugh and Associates. The inspection team was accompanied by Mr. Edward McPhearson and Mr. David Arnold who represent the owners of the pond. A copy of the visual inspection checklist is contained in Appendix A of this report. Selected photos of the dam are contained in Appendix C.

In general, the overall condition of the dam and its appurtenant structures is fair.

b. Dam - The dam is a concrete gravity and earth embankment dam. The downstream face of the concrete portion of the dam has been resurfaced with gunite in late 1965. As can be seen, the general condition of this surface is fair (Photo 6). There are areas along the entire face where the gunite is cracked and there are signs of seepage and efflouresence (Photo 3). At several locations, weep holes were installed (Photo 4) and show signs of water seeping from them. These weep holes do not appear on the original drawings and it is not known when they were installed. Also at the time of the latest resurfacing (late 1965), metal pipes were inserted into the dam to relieve leakage pressures (Photo 3). At all locations where there were signs of seepage, the amount was not measurable.

The upstream face of the dam is vertical and the water in the pond was at spillway elevation. Therefore, the upstream face could not be observed (Photo 1).

At several locations along the face of the concrete section, vegetation was growing from the cracks in the gunite (Photo 9).

At the eastern end of the concrete portion of the dam, concrete was poured along the toe at the dam/earth interface. This concrete shows signs of erosion from runoff from the easterly end and from water flowing over the concrete section (Photo 5). Riprap is generally present along the toe of the concrete section with debris and vegetation intermingled with it (Photo 6).

There were several areas below the dam and east of the spillway where water was seeping beneath the dam (Photo 10 - for location of areas see photo location plan). This is the same area in which a correction of a seepage problem was attempted in 1938.

The earth enbankment portion of the dam is 2 feet higher than the concrete section and has a concrete core wall extending a maximum 9 feet below natural ground. These embankments are overgrown with brush and trees (Photos 7 and 8) and there is no sign of seepage.

c. Appurtenant Structures - The principal spillway is a 5-foot long 1-foot deep slot in the concrete portion of the dam (Photo 2). The concrete of this spillway and the portion of the face just below the principal spillway is in good condition.

During a major storm, the entire concrete portion of the dam is used as an emergency spillway. The top of the concrete portion is in good condition. The downstream face is in fair condition as described earlier.

At the bottom of the principal spillway there is a scour hole approximately 1-foot deep (Photo 4). The riprap and concrete along the toe of the dam was placed to keep the toe from being undermined when water flows over the emergency spillway. This riprap is in good condition.

The discharge pipe is a 12-inch pipe that outlets at the toe of the dam and just west of the principal spillway (Photo 4). The outlet and channel leading from the pipe should be cleaned. The discharge pipe has a gate on the upstream face of the dam (Photo 2). The gate is not operated out of fear by the owners that once opened they will not be able to close it. Hence, the mechanism is strapped and rendered inoperable.

d. Reservoir Area - The area immediately adjacent to the pond is gently sloped lawn area of the abutting property owners. The shoreline is well kept and shows no signs of sloughing or erosion. A rapid rise in the water level of the pond will not endanger life or property.

e. Downstream Channel - The downstream channel is a natural channel of rock and gravel. The area adjacent to the downstream channel is heavily overgrown with brush and trees.

3.2 Evaluation

Overall the general condition of the dam is fair. The visual inspection revealed items that lead to this assessment, such as:

a. Seepage along the toe

b. Minor seepage through the dam

c. Cracks in the concrete surface

d. Erosion along the eastern toe of the concrete section

e. Scour at the bottom of the principal spillway

f. Inoperation of the discharge pipe

g. Vegetation on the downstream face, earth embankments, along the toe of the dam and downstream channel.

SECTION 4 - OPERATIONAL AND MAINTENANCE PROCEDURES

4.1 Operational Procedures

a. General - The operation of this facility is strickly for t purpose of recreation and the water level is kept at the principal s crest only because the discharge valve is not operable.

b. Description of Any Warning System in Effect - There is no warning system in effect for this dam.

4.2 Maintenance Procedures

a. General - There is no specific maintenance program for th however, there is periodic clearing of the vegetation on the downst side.

b. Operating Facilities - The gate and the discharge pipe ar operable. The mechanism is strapped and inoperable out of fear tha it will not close.

4.3 Evaluation

There is no regularly scheduled maintenance program, however, periodic vegetative removal. A systematic and complete maintenance should be instituted at the dam and a formal warning system should

SECTION 5 - EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

5.1 General

Mathers Pond Dam is a concrete gravity and earth embankment dam approximately 280 feet long and 18 feet high. The concrete portion of the dam is 170 feet long and is 2 feet lower than the earth embankment. There is a 5-foot long, 1-foot deep and 2-foot wide principal spillway at the center of the dam, and the entire concrete portion of the dam is used as an emergency spillway during a major storm. A 12-inch low level discharge pipe passes through the base of the dam with the gate valve on the upstream face of the dam. This valve is inoperable.

The watershed encompasses 240 acres and is 60 percent developed with the remainder wooded or open fields. The topography is rolling with terrain rising only 62 feet above the spillway crest.

The pond has a total capacity of 32 acre-feet when the pond is at the top of the earth embankment and 9.7 acre-feet at the spillway crest. Therefore, there is approximately 17.0 acre-feet (.85 inches) of storage available. The test flood outflow for this dam is 145 cfs and the spillway capacity is 1,486 cfs or approximately 10 times the test flood.

5.2 Design Data

No design data for the original dam is available. Hydraulic computations by Mozzochi Associates for the Department of Environmental Protection are found in Appendix B of this report. Independent computations for this dam were also developed and used for this report.

5.3 Experience Data

No historical data for recorded discharges or water surface elevation is available for this dam; however, the dam has withstood the floods of the 1930's and 1950's. For the two major storms, August and October of 1955, 15.64 inches and 17.29 inches of rain fell respectively. The exact discharge over the dam is not known.

5.4 Test Flood Analysis

Based on the Recommended Guidelines for Safety Inspection of Dams, the dam is classified as a small structure with a low hazard potential. The test flood for these conditions ranges from the 50-year to 100-year flood. The 100-year flood was used for this dam because of the property damage it may inflict (several roadways may be overtopped).

The test flood inflow was calculated using an equation found in the Connecticut Department of Transportation Hydaulics and Drainage Manual (1973). This formula was developed as a fast means for developing flow throughout the State and is based on USGS gaging stations. The test flood inflow by this method is 157 cfs.

The routing procedure was developed by the Corps of Engineers and gives an approximate outflow of 145 cfs. The spillway capacity of the dam is approximately 1,486 cfs or 10 times the test flood outflow. The test flood will overflow the emergency spillway by 0.45 feet.

Storage behind the dam was assumed to begin at the elevation of the spillway crest. Storage was determined by an average area depth analysis. Capacity curves for the spillway assumed a broad crested weir.

5.5 Dam Failure Analysis

A dam failure analysis was performed using the Rule of Thumb method in accordance with guidelines established by the Corps of Engineers. Failure

was assumed to occur when the water level in the pond was at the top of the dam.

Downstream conditions are such that first floor elevation of all houses are at least 7 feet above the stream bed. The main channel itself is approximately 2'x6' with most of the capcity in the overbank condition.

The spillway discharge just prior to dam failure is 1,486 cfs and will produce a depth of flow of approximately 3.8 feet several hundred feet downstream from the dam. The calculated dam failure discharge is 6,420 cfs and will produce a depth of flow of approximately 5.4 feet several hundred feet downstream from the dam or an increase in water depth at failure of approximately 1.6 feet. The failure analysis covered a distance of approximately 900 feet downstream where the depth of flow was calculated to be 5.0 feet or an increase in depth of approximately 1.2 feet.

Failure of Mathers Pond Dam should not result in the loss of lives but the flood wave may damage property, several road crossings and inundate a portion of a golf course. Economic loss, however, is not significant and therefore the dam is classified as having a low hazard potential.

SECTION 6 - EVALUATION OF STRUCTURAL STABILITY

6.1 Visual Observations

The general structural stability of the dam is good as evidenced by the vertical, horizontal and lateral alignment. The gunite face on the concrete portion of the dam does show some cracking and efflouresence but this is not indicative of an unstable dam. The earth embankment portions of the dam also show no evidence of instability. The structural stability of the dam, however, can be affected by the items noted in Section 3.2.

6.2 Design and Construction Data

The dam was constructed in 1921 from plans prepared by Major William A. Welch, Chief Engineer of the Palisades Interstate Parkway Commission.

The design and construction data consists of plans showing elevations, profiles and sections of the dam. Upon field verification of these plans, they have been used along with the visual inspection to evaluate the dam.

6.3 Post-Construction Changes

Post-construction changes are as follows:

1938 — Work was performed under the dam in a sheeted and braced excavation. Leakage had been noticed at the easterly end of the dam and concrete was poured to seal off the leak. The work was done by the Paul Bacco Company under the supervision of Charles Rumpf, P.E. At this time, or subsequently, the stone riprap facing was removed and a raised shelf was placed downstream. In addition, the overflow section underwent modifications.

1940 — The pond was emptied, and an application of pneumatic mortar (gunite) was applied to the entire dam. Also, the original 3' x 3' sluiceway was reduced to a 12-inch pipe opening. Guniting was done by the Allied Pneumatic Company under supervision of Mr. Rumpf.

1965 The existing gunite was removed; new mesh installed and a new application of gunite made to the downstream face and over the top of the dam for a distance sufficient to cover the horizontal joint created by weir modification of 1938. The pond was not dewatered at this time. Work was done by the E. L. Wagner Company under the supervision of Mr. Rumpf.

1973 A riprap gutter, 6 feet wide, was placed below the concrete section of the dam. This was intended to protect the toe when the concrete section of the dam is used as a spillway.

6.4 Seismic Stability

The dam is located in Seismic Zone 1 and in accordance with Recommended Phase I Guidelines does not warrant a seismic analysis.

SECTION 7 - ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition - After consideration of the available information, the results of the inspection, contact with the owner and hydraulic/hydrologic computations, the general condition of Mathers Pond Dam is fair.

b. Adequacy of Information - The information available is such that an assessment of the safety of the dam should be based on the available data, the visual inspection results, past operational performance of the dam and its appurtenant structures and computations developed for this report.

c. Urgency - It is considered that the recommendations and remedial measures suggested below be implemented within one year after receipt of this Phase I Inspection Report.

7.2 Recommendations

The following recommendations should be carried out under the direction of a qualified registered engineer.

a. Seepage in the vicinity of the toe of the dam should be investigated further to determine its origin and monitored to determine any change.

b. Seepage through the face of the dam should be investigated further to determine its origin and monitored to determine any change.

c. Integrity of the gunite surface should be investigated as well as the concrete in the interior of the dam.

d. Riprap along the toe of the concrete section should be investigated to determine if it can withstand the pounding of the water over the spillway.

e. Trees including stumps and root systems should be removed from the toe and embankment slopes and backfilled with proper material.

f. Evaluate the condition of the blowoff pipe and valve and make it operable.

Any recommendations made by the engineer should be implemented by the owner.

7.3 Remedial Measures

a. Operating and Maintenance Procedures -

(1) Clear the downstream channel of debris.

(2) Remove the straps from the control mechanism to the gate valve and make sure the valve is operable. Store the control handle at a convenient location.

(3) Repair all cracked and spalled concrete.

(4) Replace missing riprap along the downstream toe.

(5) Institute a program of annual technical inspection by a qualified Engineer.

7.4 Alternatives

There are no potential alternatives to the above recommendations.

APPENDIX A

INSPECTION CHECKLIST

INSPECTION CHECK LIST

PARTY ORGANIZATION

PROJECT Mathers Pond

DATE 5-30-80

TIME 1:00 p.m.

WEATHER Fair

W.S. ELEV. ____ U.S. ____ DN.S.

PARTY:

1. J. Schearer, SE, Civil
2. K. Pudeler, SE, Civil
3. G. Giroux, SE, Civil/Hyd.
4. M. Haire, DBA, Struct./Geo.
5. P. Austin, DBA, Civil
6. E. McPhearson, Owner
7. D. Arnold, Owner
8. J. Pozzato, MA, Mech.
9.
10.

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.	Dam Embankment	M. Haire G. Giroux S. Jordan	Good
2.	Mechanical - Electrical	J. Pozzato	not operating
3.	Spillway Weir	M. Haire	Good
4.	Discharge Channel	K. Pudeler P. Austin	Fair
5.			
6.			
7.			
8.			
9.			
10.			

INSPECTION CHECK LIST

PROJECT Mathers Pond DATE 5-30-80

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITIONS
DAM EMBANKMENT	
Crest Elevation	Good
Current Pool Elevation	Good
Maximum Impoundment to Date	Good
Surface Cracks	Some - minor
Pavement Condition	N/A
Movement or Settlement of Crest	None
Lateral Movement	None
Vertical Alignment	Good
Horizontal Alignment	Good
Condition at Abutment and at Concrete Structures	Good
Indications of Movement of Structural Items on Slopes	None
Trespassing on Slopes	Not allowed
Vegitation on Slopes	Minor - vines
Sloughing or Erosion of Slopes or Abutments	None
Rock Slope Protection - Riprap Failures	None
Unusual Movement or Cracking at or near Toes	None
Unusual Embankment or Downstream Seepage	Minor
Piping or Boils	None
Foundation Drainage Features	Weep holes some water
Toe Drains	Rock at toe
Instrumentation System	None

INSPECTION CHECK LIST

PROJECT Mathers Pond DATE 5-30-80

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
a. Approach Channel	Underwater
Slope Conditions	
Bottom Conditions	
Rock Slides or Falls	
Log Boom	
Debris	
Condition of Concrete Lining	
Drains or Weep Holes	
b. Intake Structure	
Condition of Concrete	
Stop Logs and Slots	

INSPECTION CHECK LIST

PROJECT Mathers Pond DATE 5-30-80

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER	N/A
a. Concrete and Structural	
General Condition	
Condition of Joints	
Spalling	
Visible Reinforcing	
Rusting or Staining of Concrete	
Any Seepage or Efflorescence	
Joint Alignment	
Unusual Seepage or Leaks in Gate Chamber	
Cracks	
Rusting or Corrosion of Steel	
b. Mechanical and Electrical	
Air Vents	
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	
Service Gates	Not operating
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System in Gate Chamber	

INSPECTION CHECK LIST

PROJECT Mathers Pond DATE 5-30-80

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - TRANSITION AND CONDUIT	N/A
General Condition of Concrete	
Rust or Staining on Concrete	
Spalling	
Erosion or Cavitation	
Cracking	
Alignment of Monoliths	
Alignment of Joints	
Numbering of Monoliths	

INSPECTION CHECK LIST

PROJECT Mathers Pond DATE 5-30-80

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	Underwater
General Condition	
Loose Rock Overhanging Channel	
Trees Overhanging Channel	
Floor of Approach Channel	
b. Weir and Training Walls	
General Condition of Concrete	Good
Rust or Staining	None
Spalling	Minor spalling on face
Any Visible Reinforcing	None
Any Seepage or Efflorescence	None
Drain Holes	None
c. Discharge Channel	
General Condition	Fair - overgrown with vege
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	Some
Floor of Channel	Rock
Other Obstructions	Debris

INSPECTION CHECK LIST

PROJECT Mathers Pond DATE 5-30-8-

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	
General Condition of Concrete	None
Rust or Staining	
Spalling	
Erosion or Cavitation	
Visible Reinforcing	
Any Seepage or Efflorescence	
Condition at Joints	
Drain holes	
Channel	
Loose Rock or Trees Overhanging Channel	Some
Condition of Discharge Channel	Fair - needs clearing

INSPECTION CHECK LIST

PROJECT Mathers Pond DATE 5-30-80

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - SERVICE BRIDGE	None
a. Super Structure	
Bearings	
Anchor Bolts	
Bridge Seat	
Longitudinal Members	
Under Side of Deck	
Secondary Bracing	
Deck	
Drainage System	
Railings	
Expansion Joints	
Paint	
b. Abutment & Piers	
General Condition of Concrete	
Alignment of Abutment	
Approach to Bridge	
Condition of Seat & Backwall	

APPENDIX B

ENGINEERING DATA

Information pertaining to the history, maintenance and modification to Mathers Pond Dam as well as copies of past reports are located at:

State of Connecticut
Department of Environmental Protection
Water Resources Section
State Office Building
Hartford, Connecticut 06115

MOZZOCHI ASSOCIATES
CIVIL ENGINEERS

GLASTONBURY, CONN. 06033
817 HEBRON AVENUE
PHONE 633-9401

PROVIDENCE, R. I. 02903
169 WEYBOSSET STREET
PHONE 421-0420

PARTNERS
JOHN LUCHS, JR.
STUART J. BECKERMAN

October 14, 1970

REPLY TO: Glastonbury

William H. O'Brien, III
Civil Engineer
Water Resources Commission
State Office Building
Hartford, Connecticut 06115

Re: Mathers Pond Dam
Darien, Connecticut
Our File #57-73-91

Dear Mr. O'Brien:

As requested in your letter of authorization, the dam has been checked for spillway adequacy and for safety. Listed below is pertinent information for the structure.

Drainage Area	240 Acres
Pond Area	5 Acres
Dam	Concrete structure
Spillway	Trapezoidal notch in top of concrete dam. 5.7'x4.9'(bottom) x 1.0' depth
Spillway capacity (without overtopping)	18.0± Cfs
Vertical Height of Dam (Max.)	15'± to riprap shelf 20'± to valley floor
Length of Concrete Dam	165.7' with earth embankments 1' to 2.5'± above top of concrete at either end
Draw-down pipe	12" tile

The maximum water surface elevation has been computed as follows:

	TYPE OF STORM	RAINFALL INTENSITY - 6 hrs.	MAX. W.S. ELEV. ABOVE TOP OF CONC. DAM
1.5	x 100 years storm	7.5"	.75 Ft.
	100 " "	5.0	.52 Ft.
	50 " "	4.5	.43 Ft.

The existing trapezoidal spillway is completely inadequate to handle flood flows. The concrete dam is therefore overtopped and the whole dam acts as a spillway. To eliminate erosion at the downstream toe of the dam, riprap has been placed to form a shelf approximately 12' wide. This in turn drops off to the main valley floor elevation.

Listed below are my recommendations for corrective work to make this a safe structure:

1. Raise elevation of earth embankments at either end of concrete structure to provide a minimum freeboard of 2'-0" above maximum water surface. (this applies to a section removed from the concrete structure at the S.E. corner of pond.)

2. Make top width of earth embankments 10'-0" with 3:1 slopes.

3. Provide protection to earth embankment where it joins concrete structure.

4. Add additional riprap at downstream toe of concrete structure as required.

5. Remove flash board appurtenances on top of concrete dam and plug with concrete.

6. Repair minor spalling on downstream concrete face of dam.

7. Remove all trees and brush from earth embankments.

If you have any questions, please call.

Very truly yours,

MOZZOCHI ASSOCIATES

by John Luchs, Jr., P. E.

JLjr:ed
file

TABLE OF CONTENTS

INTRODUCTION

The Mather Pond Dam was constructed in 1921 by Mr. Stephen Mather on his estate in the northeastern part of Darien. The Dam was designed by Major William A. Welch. Construction was performed by Mr. Mather's superintendent and local labor under the guidance of Major Welch. All of the parties to the original work have passed away and no information is available as to the actual conditions encountered in the original construction of the dam and its foundation, or whether any modifications were made to the original design.

From records of the Towns of Darien and New Canaan, the watershed area of the Dam is shown by Exhibit 1. The area is approximately 240 acres.

Through the assistance and good fortune of Mr. E.R. McPherson, Jr. whose wife, Bertha McPherson is the daughter of Mr. Mather and is also one of the dam owners, the original design drawings have only recently been obtained from the historical records of Major Welch at the Palisades Interstate Parkway Commission where he had been Chief Engineer.

Simultaneously with efforts to trace the original design, or as-built drawings, a review of the history of the dam was made. Mr. McPherson made his files available which proved helpful.

The Water Resources Commission staff has also cooperated in permitting us to review their file on the Dam, including the various reports of their Engineers and Consultants.

From these data, the history of the Mather Pond Dam can be summarized by Exhibit 2.

Subsequent to obtaining the original design drawings, hand probings were made by a laborer in the field in order to verify the existence of the

concrete wing walls of the main dam, core walls of the side earthen dam, and the dam footing. These structures were indicated on drawing M-3 prepared by Major Welch entitled "Plans for Concrete and Core Wall Dams". The probings provided evidence that these structures existed in those areas shown on the drawing. Naturally, the only way to have fully verified this would have been to uncover the structures entirely, which was not feasible. Subsequent to this, elevations were taken at the site.

THE DAM AS DESIGNED

The design drawing M-3 prepared by Major Welch indicated a 13' wide footing under the two center dam pours which were 30' long each. The top of the footing was at Elevation 85 and the bottom was to be at Elevation 81, approximately, judging from the main elevation view of the Dam, "if no rock is encountered". Our probings appear to indicate a footing in the area shown on the drawing. However, it cannot be determined what the soil conditions were at the bottom of the footing, nor how the foundation was treated prior to pouring the footing, such as by benching into rock, or the like.

The main section of the dam was planned for vertical joints at 30' intervals. Two V-notch keyways are shown at these vertical joints. Although reference is made them as "Expansion Joints", no expansion joint material or waterstop was indicated at the joint. Assuming the dam was constructed as shown, the keyways should provide resistance against any tendency to rotate, even assuming the concrete footing did not exist.

Two continuous keyways were designed at the horizontal joint which separates the footing from the stem. This key should provide resistance against any sliding tendency across this plane. No waterstops are shown across this joint, and no seepage is evident.

The design drawings indicate that each gravity dam section was to be formed in its entirety and apparently each 30' section was intended to be poured in one operation thereby eliminating a cold joint which might have been a source of leakage.

Crest control was originally by means of a 120' rectangular weir, one foot deep, which permitted overflow to occur over the entire 120' section. Such an area should have been ample to take substantial flood flow without overtopping the main dam. Photos of the original construction, previously forewarded to the Water Resources Commission, appear to indicate the weir was constructed as designed. Other photos at that time show that large stones were placed on the downstream face of the dam and over the top of the footing as designed. No stone rip-rap was indicated at the earthen side slopes.

A 3' x 3' sluiceway is shown at the base of the dam near the center with a gate valve and control assembly located at the top of the dam.

At each end of the concrete gravity dam were concrete core walls, keyed into the main dam section and covered with earth. Northeast from the gravity dam was an earthen dam with a concrete core wall.

A metal bracket system of supports along the top of the gravity dam provided capability for a wooden walkway raised in height so that one could walk from one side of the dam to the other.

THE PRESENT DAM

The existing weir is also one foot deep but is unable to handle more than a moderate to heavy storm. As a result, water tends to overflow the entire 167' dam width on occasion, spilling over on to the unprotected earthen side embankment causing erosion. (Photo A and B)

The upstream face of the dam cannot be viewed since the valve is inoperable and the pond cannot be lowered by this means. Soundings we

have taken indicate a build-up of soil or silt at the upstream face to a depth of perhaps 3' or more. Such a build-up may offer added resistance to possible passage of water under the dam, if it can occur. It may also render the existing gate valve somewhat more inaccessible.

The entire visible surface of the dam is covered with a pneumatically applied coat of mortar. In various locations, metal pipe sections of small diameter have been inserted in the gunite, perhaps to relieve the leakage pressure. (Photo C). It is understood these were installed at the time of the latest application of gunite in late 1965.

A 15' wide shelf of stone, boulders, coarse gravel and the original rip-rap dam facing now exists along the downstream toe of the dam. The water overflowing the weir and the main dam falls onto this shelf and thereupon flows downstram.

There are indications of a joint in the gunite in several places, but it does not continue over the full section of dam, nor does it appear to match the construction joints in the dam. At the eastern end of the dam a slight raised section has been built (Photo D), and the gunite was splayed over the adjacent earth, which may have protected this side and reduced erosion on the eastern side.

At the western end (Photo E), no such raised section was built at the top of the dam, and slight erosion can be seen to have occurred to the top of the earthen embankment of the adjacent core wall which is below the present top of the dam. It would thus appear that the present top of dam is somewhat higher than its original elevation, which would appear to confirm that slight modification may exist to the top of dam surface as well as to the width of the overflow section as originally designed.

At a location about 40' from the western end of the gravity dam, the earthen embankment resembles the design section (Photo F), and no evidence

exists of any overtopping. Statements of the owners confirm that no overtopping of the earthen dam areas containing concrete core walls has ever been observed.

At the eastern end of the dam, about 100' northeast of the exposed concrete, visible evidence of the buried concrete core wall in the side dam can be observed. (Photo G). Tree roots have grown over the concrete core wall and are heavily matted. The embankments appear to be in sound condition and no evidence can be seen of any overtopping in this area.

The original 3' x 3' sluiceway at the base of the dam has been filled with concrete and a 12" pipe installed within it. The wheel handle has been removed from the assembly (Photo H), and it is understood that the original gate valve was replaced about 30 years ago with a suitable valve for the smaller circular pipe opening.

Except for several minor spalled areas, the condition of the 1965 gunite surface appears reasonably good. However, because of the gunite it is not possible to view the concrete dam itself. Efflorescence is noticeable at various locations from seepage, but no evidence of distress is noted at any location.

The stubs of the metal walkway supports still protrude through the gunite at the top of the dam, but appear to present no problem. (Photo I). The walkway was apparently removed in 1938.

STABILITY ANALYSES

Theoretical calculations were made of the section of dam as originally designed by Major Welch. The following conditions were investigated:

1. Overturning about the footing base.
2. Overturning about the dam-footing intersection.
3. Sliding along the plane of the footing base.
4. Sliding along the plane of the dam-footing intersection.

For the following reasons these theoretical calculations should be considered no more than a guide to potential stress conditions:

A. No knowledge is available as to the actual conditions encountered during foundation construction, nor is any likely to be obtained.

B. It has not been possible to inspect the upstream face of the dam.

C. The Dam has been standing for more than fifty years, and shows no signs of structural distress even though it has experienced several hurricane storm floods.

D. Estimation of uplift, ice, and the resistance of the concrete is difficult to adjudge, and the results have little meaning because the dam is obviously stable.

However, under these obvious limitations, stability analyses can be performed as a mathematical exercise, and preliminary results are as follows:

1. Assuming no ice or uplift, no tension is indicated at the footing base, and maximum soil pressure is less than 2T/sf. To the extent that ice or uplift forces might exist, it is possible to show mathematically that some tension could occur at the upstream side of the footing only if the restraint provided by the joint keys mobilizing the mass of the dam and footing could not take place.

2. Assuming no ice or uplift, no tension is indicated above the plane of the dam-footing intersection. To the extent that ice or uplift were possible at that level, tension might tend to exist only to the extent that the keyways were unavailable.

3. Assuming some passive resistance from the gravel shelf, there appears little likelihood of sliding along either the plane of the footing bottom or the dam base.

RECOMMENDED REPAIR

With the new information, we comment on the 7 items suggested for repair as outlined in letters of October 14, 1970 and December 5, 1972.

a. ITEMS 1, 2, and 7.

These relate to raising the earth embankments, widening them, and removing various trees. Due to the existence of the concrete core walls, and because no overtopping of the earth embankments has ever been observed, even during the 1955 hurricanes, an expenditure for such work would provide little added effectiveness over the actual condition which has existed for over 50 years. It should be noted that were the soil cover over the core wall to erode, water would tend to be released only to the core wall top. Were the core wall to give way, a release could take place only to the level

of the adjacent ground level, which is about 2.5' below the pres
invert.

b. ITEMS 3 and 4.

These relate to a remedy for embankment erosion which h
place. There are several possible solutions, however, due to the
ility of the location, a hand placed stone gutter, properly shape
by Sketches SK-1 and SK-2 appears most appropriate at this time.
prevent water flow around the side of the present dam, the top of
section of dam will be raised slightly so that any overflow will
on to the stone gutter. This work is recommended at the west sid
and will not affect the dam or the pond level.

c. ITEM 5.

The metal sockets protruding from the gunite at the top
are remnants of former handrail brackets, and do not relate to th
erection of flashboards. No matter how carefully done, removing
the breakage of gunite and for this reason no removal is recommen
time unless a safety consideration governs with which we are not

d. ITEM 6.

Any gunite patching is entirely cosmetic in nature, and
there is so little that might be done, it is suggested this be de

SUMMARY.

Since the surface of the dam is covered with gunite, it is n
to observe the dam concrete. We have learned also that an event
over 30 years ago which prompted certain repair, and evidence sug
the repair was performed to the complete satisfaction of the Engi
time.

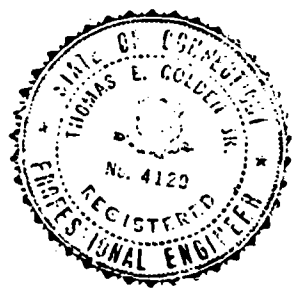
In light of these facts, it is suggested that occasional ins
the dam and its foundation be made. The nature of the 1938 event
repair was apparently a progressive soil erosion caused by seepag
dam. Criteria which have been recommended* in selecting proporti
masonry dams on varying soil types of foundation materials might

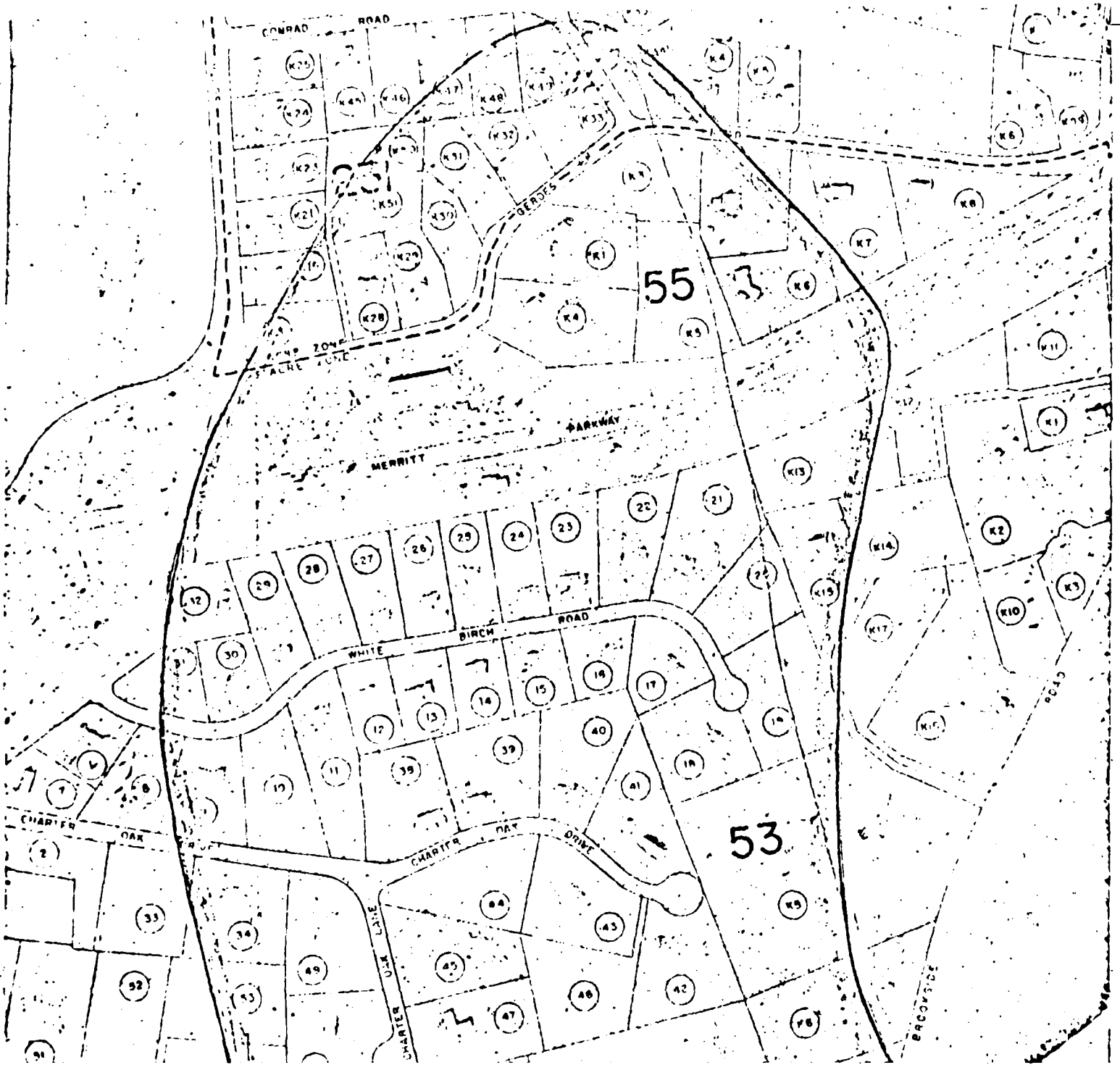
* Lane, "Security from Underseepage, Masonry Dams on Earth Found
ASCE Transactions 1935, Vol 100.

such observation of the shelf area for evidence of seepage.

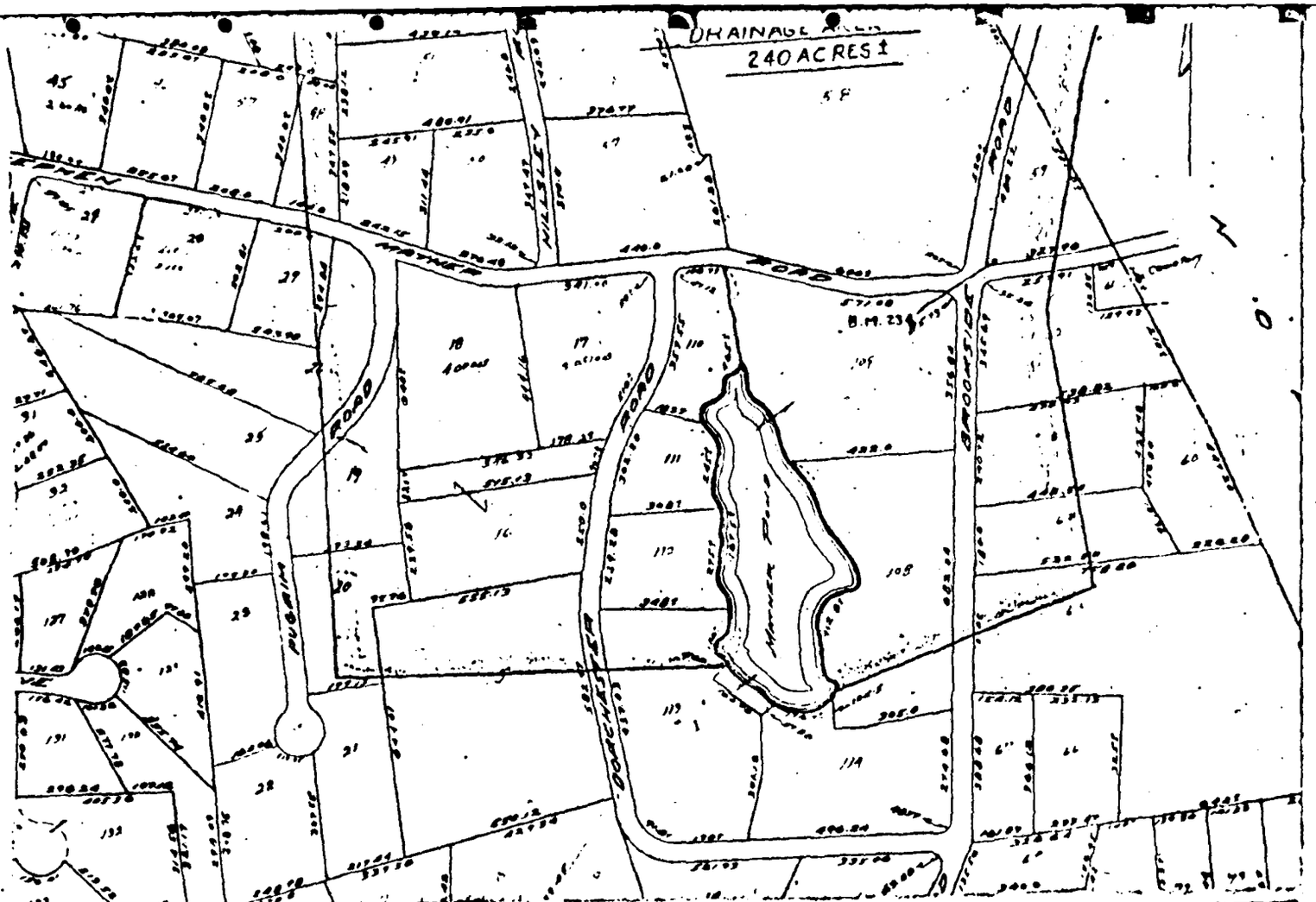
Very truly yours,

Thomas E. Golden, Jr. P.E.




CONRAD ROAD
55
53
MERRITT PARKWAY
WHITE BIRCH ROAD
CHARTER OAK DRIVE
CHARTER OAK LANE
BROOKSIDE ROAD


53
DRAINAGE AREA
240 ACRES ±



REVISIONS	THOMAS GOLDEN ASSOCIATES ENGINEERS 694 POST ROAD DARIEN, CONNECTICUT 06820		
	TITLE MATHER POND DAM- DRAINAGE AREA		
1	SCALE	DR. BY	DRAWING NO. EXHIBIT- I
	DATE	CK'D. BY	

STANPAT PRODUCTS INC. PORT WASHINGTON, N.Y.

Exhibit 11.

HISTORY OF THE MATHER POND DAM

1921 The dam was constructed from plans prepared by Major William A. Welch, Chief Engineer of the Palisades Interstate Parkway Commission.

1937 The Merritt Parkway was built within a portion of the watershed.

1938 10.35" of rain was recorded at the Stamford Reservoir of the Stamford Water Company during the September hurricane. In only one previous month in the dam's history had this been exceeded. That occurred in September 1934 when 14.09" fell.

1938 In October of this year an event was noticed which required repair. Owner's photos which have been filed with the Water Resources Commission indicate work was performed under the dam in a sheeted and braced excavation. It is understood that leakage had been noticed at the easterly end of the dam, and concrete was poured to seal off the leak. The work was done by Paul Bacco Co. under the supervision of Charles Rumpf, P.E. At this time, or subsequently, the stone rip-rap facing was removed and a raised shelf was placed downstream. In addition, the overflow section underwent modification.

1940 The pond was emptied, and an application of pneumatic mortar (gunite) was applied to the entire dam. Joints matched the original vertical joints in the dam. From other photos, also on file with the Commission, the original 3' x 3' sluiceway existed at this time but was subsequently reduced to a 12" pipe opening. Guniting was done by Allied Pneumatic Co. under supervision of Mr. Rumpf.

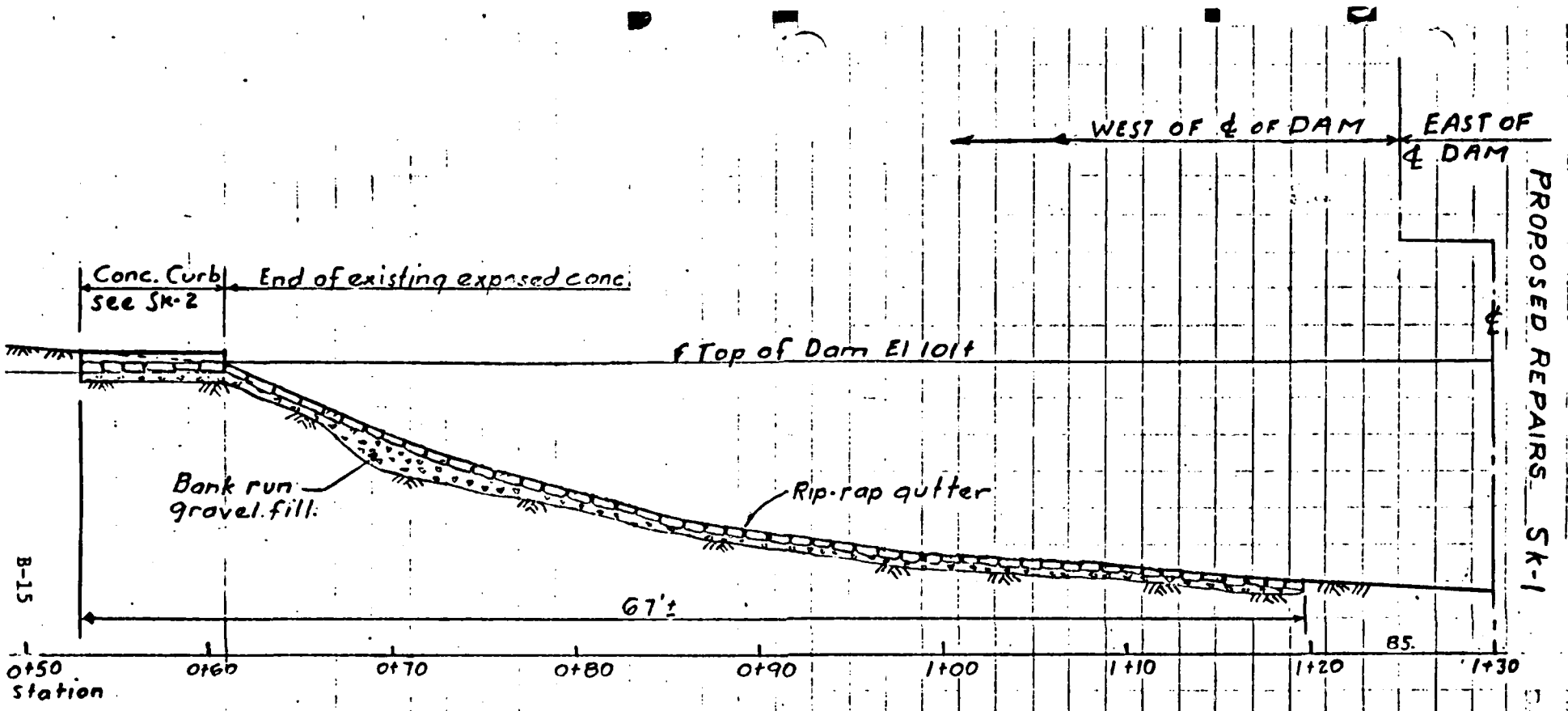
1955 Two major storms were recorded. In August, 15.64" fell, and in October, 17.29" fell. The latter was an all-time record.

1965 Joseph Cone, Consulting Engineer to the Water Resources Commission submitted a report to them concerning the Dam.

1965 In late 1965 a program of repair was undertaken. The existing gunite was removed; new mesh installed, and a new application of gunite made to the downstream face and over the top of the dam a distance to cover the horizontal joint created by weir modification. The pond was not dewatered at this time. Work was done by E.L. Wagner Co under the supervision of Mr. Rumpf.

1970 In December, State representatives considered the Cone Report with other Consulting Engineers, Mozzochi Associates. They jointly considered there was no immediate concern over the safety of the structure, but recommended 7 remedial steps.

1972 The State advised the Dam owners to perform repair work in accordance with the advice of Mozzochi Associates as noted by their letter report of October 14, 1970.



SECTION THRU GUTTER

GENERAL NOTES:

1. Clear and grub gutter and work areas.
2. Furnish and install well graded bank run gravel fill and sub-base for rip-rap gutter. (4" Min)
3. Furnish and install hand-placed stone rip-rap gutters from approved material shaped as shown.
4. Stone shall be laid up dry.
5. For other details see Sk-2
6. All disturbed lawn areas shall be re-seeded

STAINER POND DAM

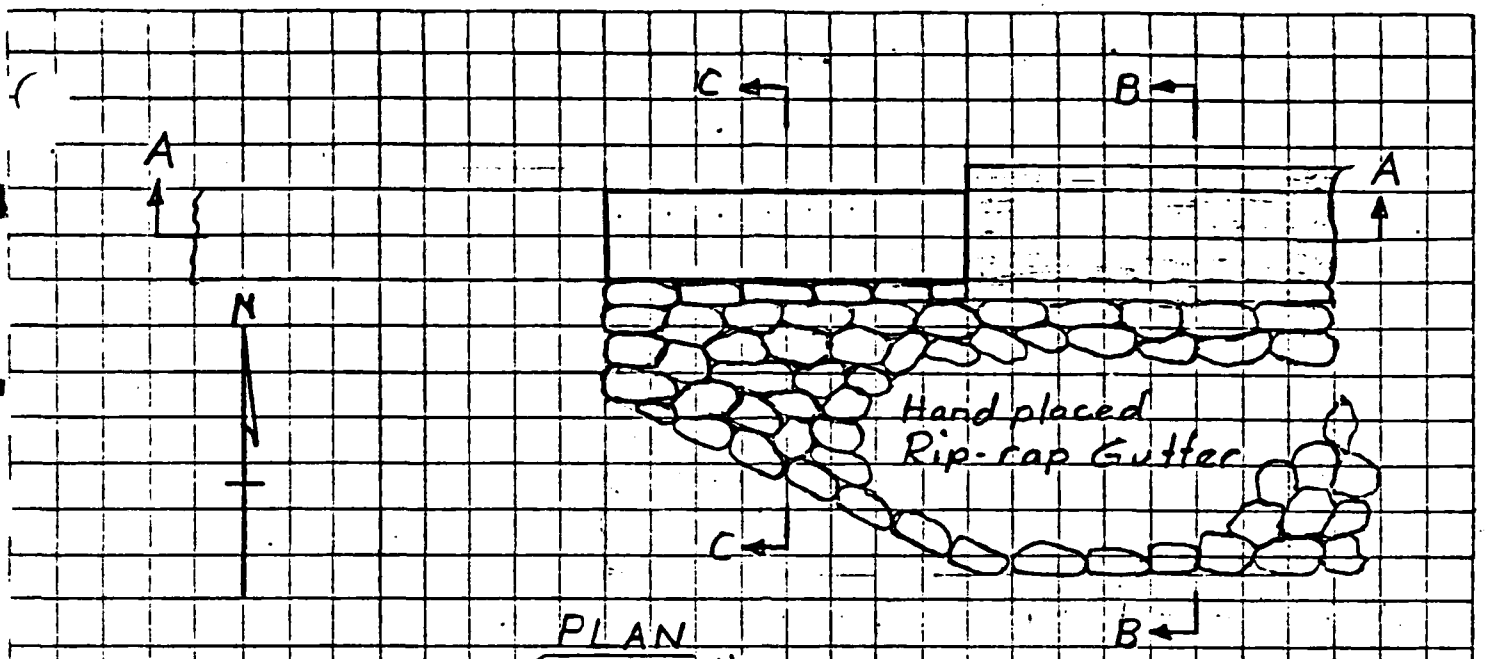
PROPOSED REPAIRS Sk-1

May 14, 1973

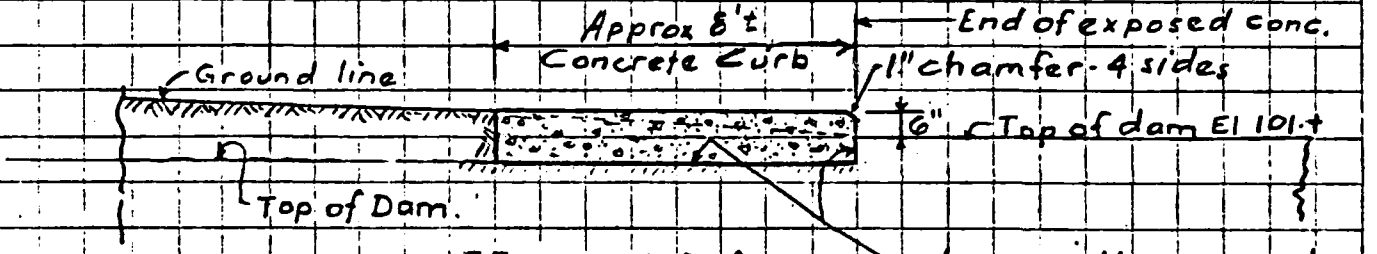
TEG-P.DE

NAME [illegible]

PROPOSED REPAIRS SK-2 DATE 5/14/73

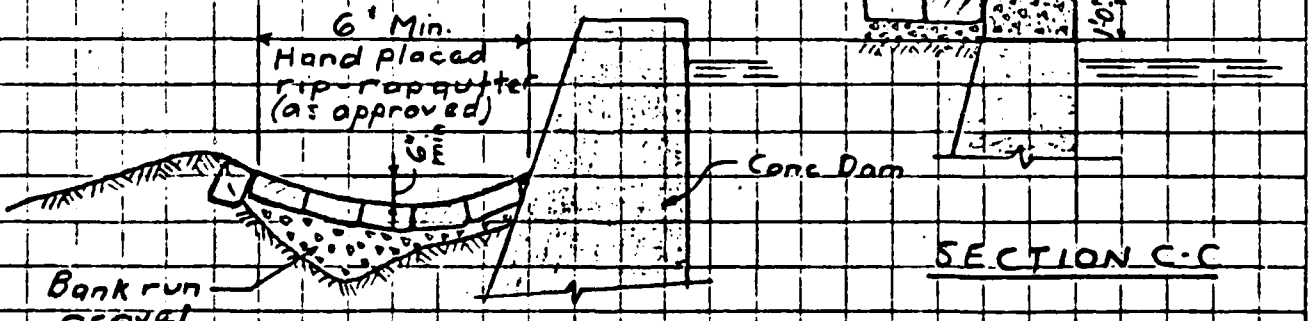


PLAN
(West End)



SECTION A-A
Scale 1"=1'-0"

clean existing concrete surface thoroughly and apply bonding compound by "Sika" or equal. To be applied as per manufacturers instructions.



SECTION B-B

SECTION C-C

MUESER · RUTLEDGE · WENTWORTH · & · JOHNSTON
Consulting Engineers

WILLIAM H. MUESER
PHILIP C. RUTLEDGE
PAUL M. WENTWORTH
ROBERT C. JOHNSTON
SALVATORE V. DESIMONE
JAMES P. GOULD
ELMER A. RICHARDS
EDMUND M. BURKE
Partners

415 MADISON AVENUE
NEW YORK, N. Y. 10017
212 ELDORADO 5-4800
DANAROMIEL, NEW YORK

JAMES D. PARSONS
NICHOLAS W. KOZIAKIN
MAX BERNHEIMER
GEORGE L. MOORE
Senior Associates

DOMINIC A. ZARRELLA
PETER H. EDINGER
CHARLES R. HEIDENGREN
Associates

May 15, 1973

Mr. Thomas E. Golden, Jr.
Thomas Golden Associates
694 Post Road
Darien, Connecticut 06820

Re: Mather Pond Dam
Darien, Conn.

Dear Mr. Golden:

In accordance with your request the writer has reviewed prints of the original design drawings for the dam prepared by William A. Welch dated December 1920, a series of correspondence from June 1965 thru January 5, 1973 between several engineers and the State of Connecticut Water and Related Resources Division of the Department of Environmental Protection together with your summary of the history of the dam. On May 12, 1973 I inspected the dam with you and one of your associates.

I will not attempt to go into any details of the history of gunite facing repairs to the dam but will concern myself only with the present condition of the dam and my opinions concerning its safety.

All visible evidence indicates that the dam was constructed in accordance with a competent engineering design prepared by Mr. William A. Welch in 1920. I observed the evidence of the concrete core walls in the earth abutments of the dam and in the low earth embankment to the east of the dam. The concrete of the dam itself has been covered by gunite and could not be inspected. However, the gunite on the downstream face shows only a minor amount of cracking with some efflorescence from seepage and a few small spots of dampness which would indicate that the concrete must be effectively intact as a water barrier. The seepage evidences were definitely less than normal in an old concrete dam.

The writer looked particularly for evidences of underseepage in the downstream area below the toe of the dam and downstream from the abutments and could find none except for a small area of dampness a short distance to the left or east of the center of the dam. This area showed no evidences of subsurface erosion or of any significant amount of underseepage and the water present may be back flow from the stream downstream from the dam.

There is a flat crested notch about five feet wide at the center of the concrete dam that serves as a normal flow spillway. For maximum flood flows the entire length of the crest of the concrete dam serves as a spillway. On the right or west side of the dam on the slope up to the abutment there is some erosion of earth downstream from the dam resulting from such overflow waters moving downslope to the stream. No such erosion was observed on the left abutment slope. At the right end of the concrete dam there is some evidence of minor earth erosion that should be corrected to prevent flood water from flowing around the right end of the dam. The writer recommends that the concrete core wall at this location be exposed and its height raised about one foot for a length of five to ten feet to where the existing earth embankment is about this much above the concrete dam crest. The erosion area on the downstream right abutment should be corrected by filling in with a bankrun gravel topped by stone riprap with maximum size stones about twelve inches average dimension. This should serve to prevent future erosion of the abutment soil.

This dam has been standing for over fifty years and has experienced major runoff from several hurricane type storms. In the writer's opinion its condition and appearance are excellent, far better than many old dams the writer has inspected. In view of the long history and the present appearance of the dam there can be no question concerning its structural stability and analyses have little meaning. There is no evidence of detrimental seepage thru or under the dam. Tree roots and shrubs have not affected the abutments or the low embankment to the east of the main dam and the concrete core walls appear to be completely effective. In summary, with the minor repairs recommended herein the writer believes that this dam will be completely safe for many years to come although inspections at five year intervals would be desirable.

We trust that this report will be of assistance to you with the Connecticut Department of Environmental Protection or other

agencies concerned with dam safety.

Very truly yours,

MUESER, RUTLEDGE, WENTWORTH & JOHNSTON

By Philip C. Rutledge
Philip C. Rutledge

PCR:ig

MOZZOCHI ASSOCIATES
CIVIL ENGINEERS

POST OFFICE BOX 230
GLASTONBURY, CONN. 06033
317 HEBRON AVENUE
PHONE 633-8401

PROVIDENCE, R. I. 02903
169 WEYBOSSET STREET
PHONE 421-0420

REPLY TO: Glastonbury

PARTNERS
JOHN LUCHS, JR.
STUART J. BECKERMAN

July 3, 1973

Mr. Victor F. Galgowski
Superintendent of Dam Maintenance
Department of Environmental Protection
State Office Building
Hartford, Connecticut 06115

Re: Mathers Pond Dam-Darien
Our File #57-73-91

Dear Mr. Galgowski:

We have reviewed Mr. Golden's report as requested. I would also like to compliment Mr. Golden on his thorough research and investigation of this particular site. He should be congratulated on his ability to "find" the original drawing of the dam - I never expected to have anyone find them.

On page six of Mr. Golden's report, he replies to my seven (7) original comments of October 14, 1970. Listed below in his same order are my additional comments:

a. Item 1, 2 and 7

Our present practice of requiring a minimum freeboard of 2' above maximum high water is a conservative request. This allows for wave action and should not be compromised. The presence of a core wall (of unknown length and soundness) does not diminish the need for this requirement.

The 10' top width could be reduced somewhat without seriously reducing the safety of the embankment.

Standard operating proceedures calls for the removing of trees and brush from earth embankments. The reasons for this are well known.

b. Items 3 and 4

Mr. Golden agrees to raise the embankment adjacent to the concrete structure in this instance. My comment was intended to protect the earth embankment with rip-rap are something similar due to the fact that [illegible] the dam acts as a spillway with high velocities at this point.

b. Items 3 and 4 (cont.)

It is also recommended that the proposed stone gutter be placed on both the East and West side. The conditions are basically the same.

c. Item 5

The deteriorating gunite may be indicative of problem concrete behind it. If Mr. Golden feels this is not needed at this time, I would recommend he provide a schedule when this will be checked.

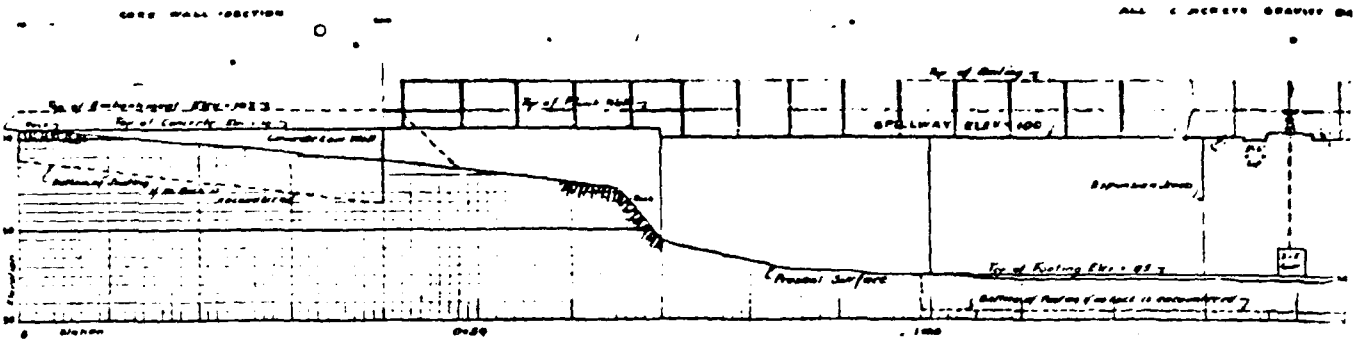
If you have any questions, please call.

Very truly yours

MOZZOCHI ASSOCIATES

John Luchs, Jr., P.E.

JLjr/ed
file



ELEVATION AND S
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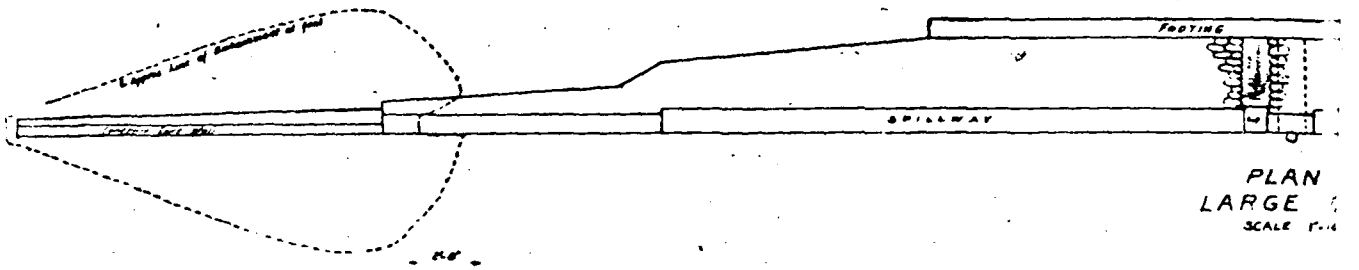
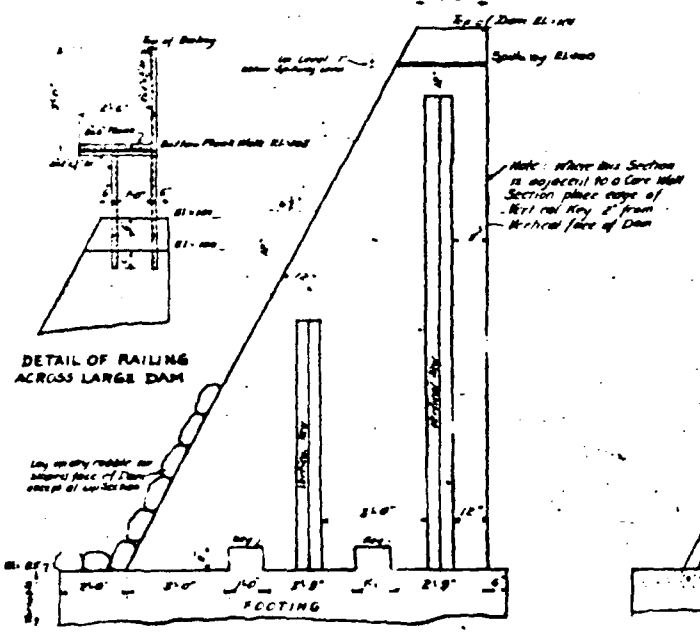
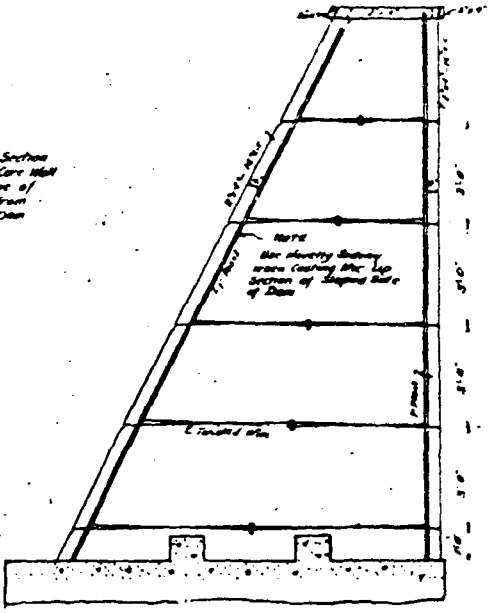
SCALE



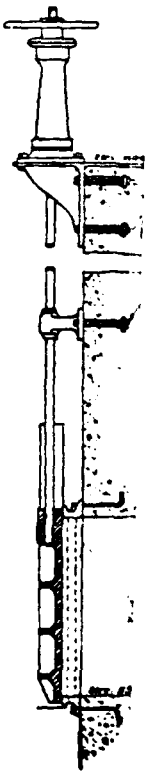
PLAN
LARGE
SCALE



SECTION AT LARGE DAM



DETAIL OF FORM FOR LARGE DAM



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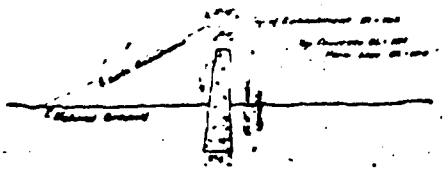


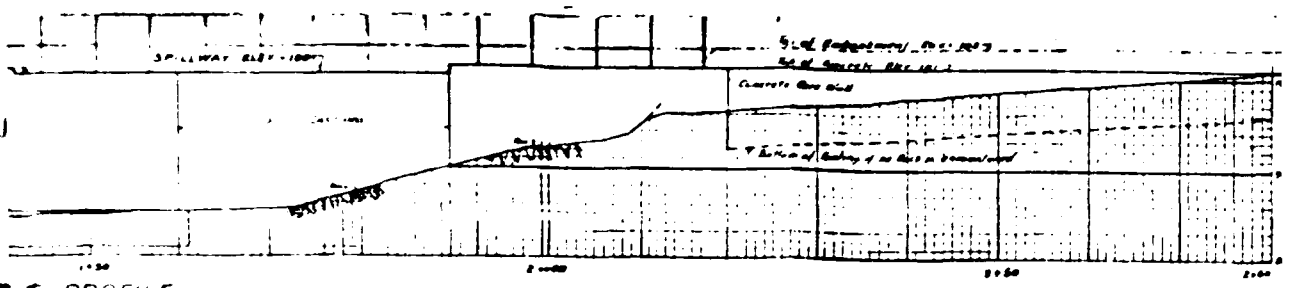
SECTION OF A CORE WALL DAM

DETAIL OF VERTICAL KEY

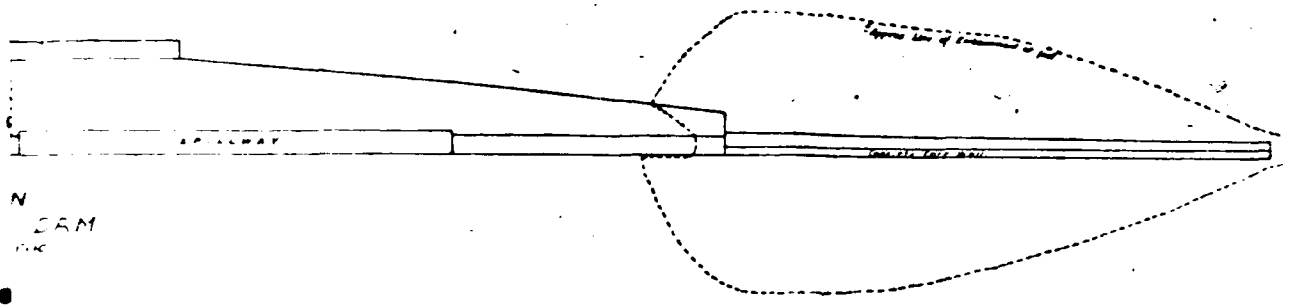
NOTE: POST CONSTRUCTION CHANGES,
1938-TOP OF CONCRETE RAISED TO ELEVATION
101 WITH 5' LONG x 1' DEEP PRINCIPAL SPILLWAY
CREST ELEV 100

1940 - 3' x 3' GATE REDUCED TO 12" PIPE

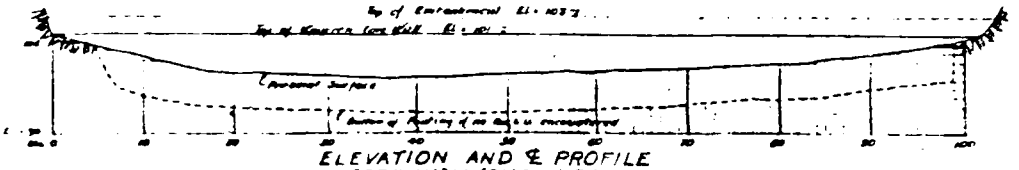
ELEV 100 = ELEV. 207 (NGVD)



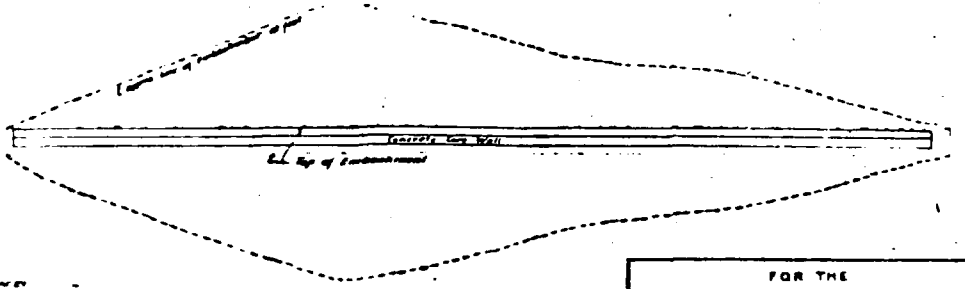
& PROFILE
DAM



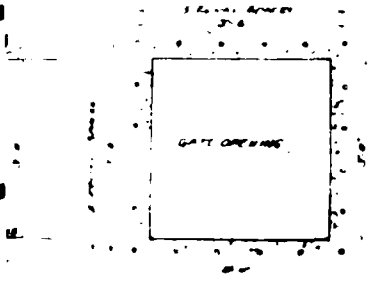
N
DAM



ELEVATION AND & PROFILE
CORE WALL (SMALL) DAM



PLAN
CORE WALL (SMALL) DAM



IL OF GATE SETTING

FOR THE
HON. STEPHEN T. MATHER
DARIEN, CONN

PLANS FOR
CONCRETE AND CORE
WALL DAMS

DRAWING N° M.3-FILE 100

STORCH ENGINEERS
WETHERSFIELD, CONNECTICUT

US ARMY ENG NE
CORPS C
WALT

NATIONAL PROGRAM OF INSPECTION OF

MATHERS POND DA

SCALE AS

DATE SEP

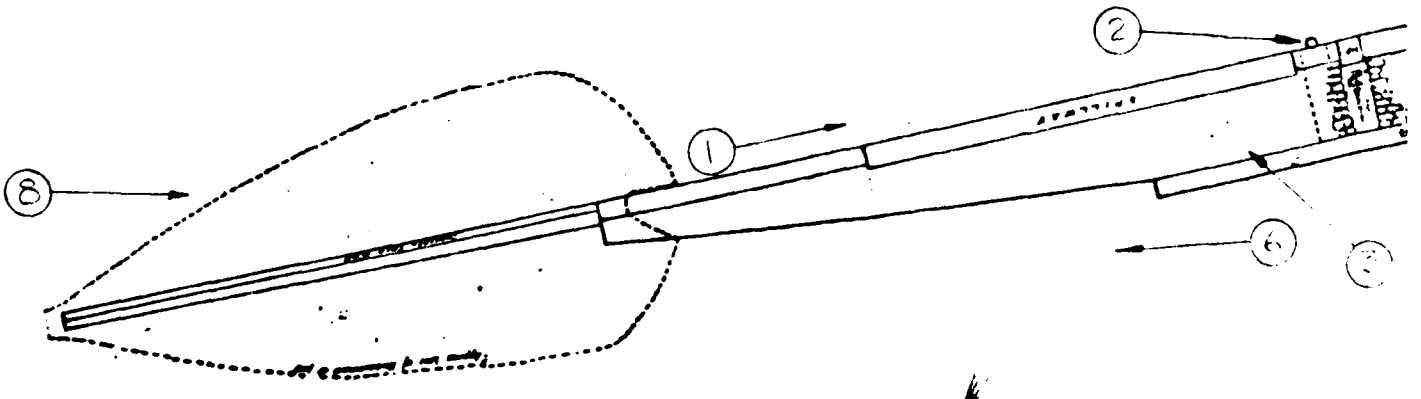
PHOTO REDUCED

NOT TO SCALE

APPENDIX C

PHOTOGRAPHS

MATHER PON



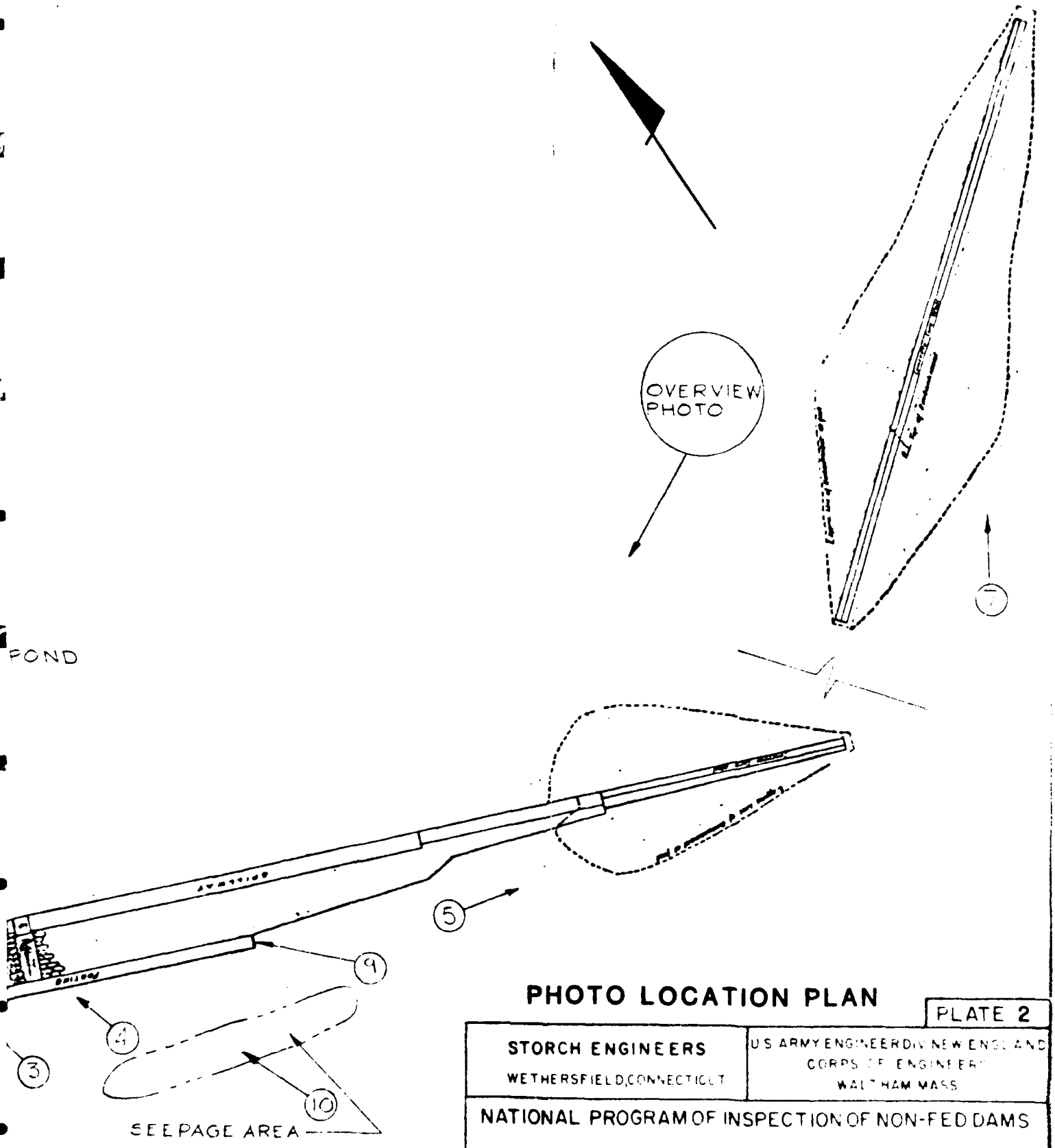


PHOTO LOCATION PLAN

PLATE 2

STORCH ENGINEERS WETHERSFIELD, CONNECTICUT	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS

MATHERS POND DAM

not to scale

SCALE AS SHOWN

DATE SEPTEMBER 1980

PHOTO 1

CREST OF DAM LOOKING EAST

PHOTO 2

SPILLWAY AND VALVE STEM

PHOTO 3

SEEPAGE THROUGH DOWNSTREAM FACE

PHOTO 4

BLOWOFF PIPE AND SPILLWAY SPLASHPAD

PHOTO 5

TOE OF DAM - EAST SIDE

PHOTO 6

DOWNSTREAM FACE AND TOE OF DAM - WEST SIDE

PHOTO 7

EASTERN EMBANKMENT

PHOTO 8

WESTERN EMBANKMENT

PHOTO 9

SEEPAGE AND CRACKING - DOWNSTREAM FACE

PHOTO 10

SEEPAGE UNDER TOE OF DAM

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

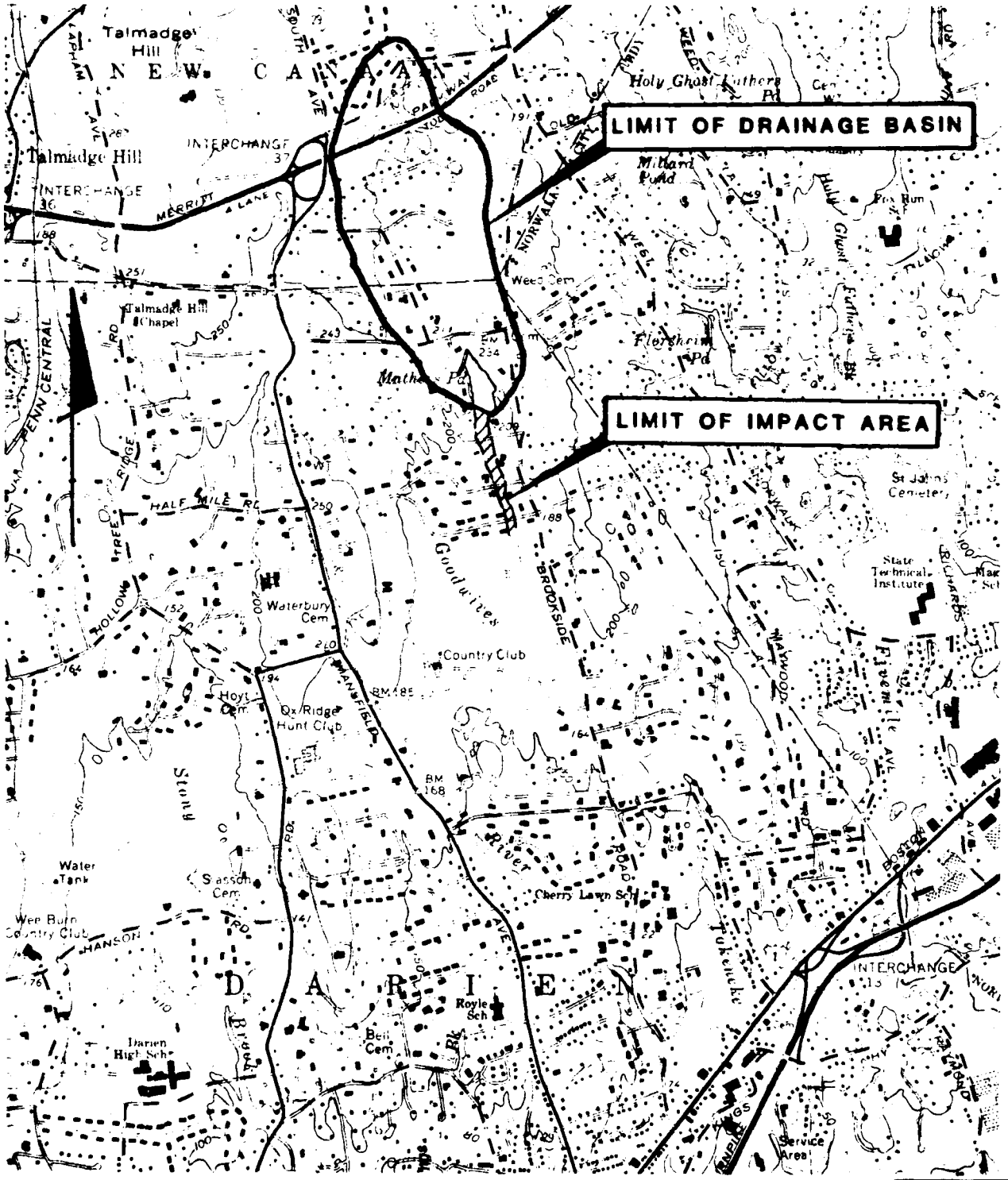


PLATE 3

STORCH ENGINEERS WETHERSFIELD, CONNECTICUT	U.S ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM MASS

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

MATHERS POND DAM

scale 1:24000

SCALE AS SHOWN

DATE SEPTEMBER 1980

STORCH ENGINEERS
Engineers - Landscape Architects
Planners - Environmental Consultants

JOB Phase I Dam Inspection - #4463
SHEET NO _____ OF _____
CALCULATED BY GJG DATE 6/12/80
CHECKED BY _____ DATE _____

Determination of Test Flood

NAME OF DAM Mather Ford Dam

DRAINAGE AREA 240 Acres - 0.375 SM

INFLOW Size - Small Hazard - Low

Use 100 yr freq.

$Q_{100} = 340\ A^{.79}$ * A = DA in SM

$Q_{100} = 340(.375)^{.79} = 157$ cfs

Estimating the effect of surcharge storage on the Maximum Probable Discharges

1. Q_{P1} = 157 cfs
2a. H_1 = 101.5 (elev.)
b. $STOR_1$ = 0.41"
c. $Q_{P2} = Q_{P1}(1 - STOR_1/49)$ = 144 cfs
3a. H_2 = 101.45 $STOR_2$ = .38
b. $STOR_A$ = 0.39"

$Q_{PA} = 157(1 - .39/4.9) = 145$ cfs

H_A = 101.45 $STOR_A$ = 0.38"

Test Flood = 145 cfs

Capacity of the spillway when the pond elevation is at the top of the dam

Q = 1496 cfs or 1030 % of the Test Flood

* Formula found in Penn DOT Drainage Manual (1972) Based on USGS Gages throughout the State.

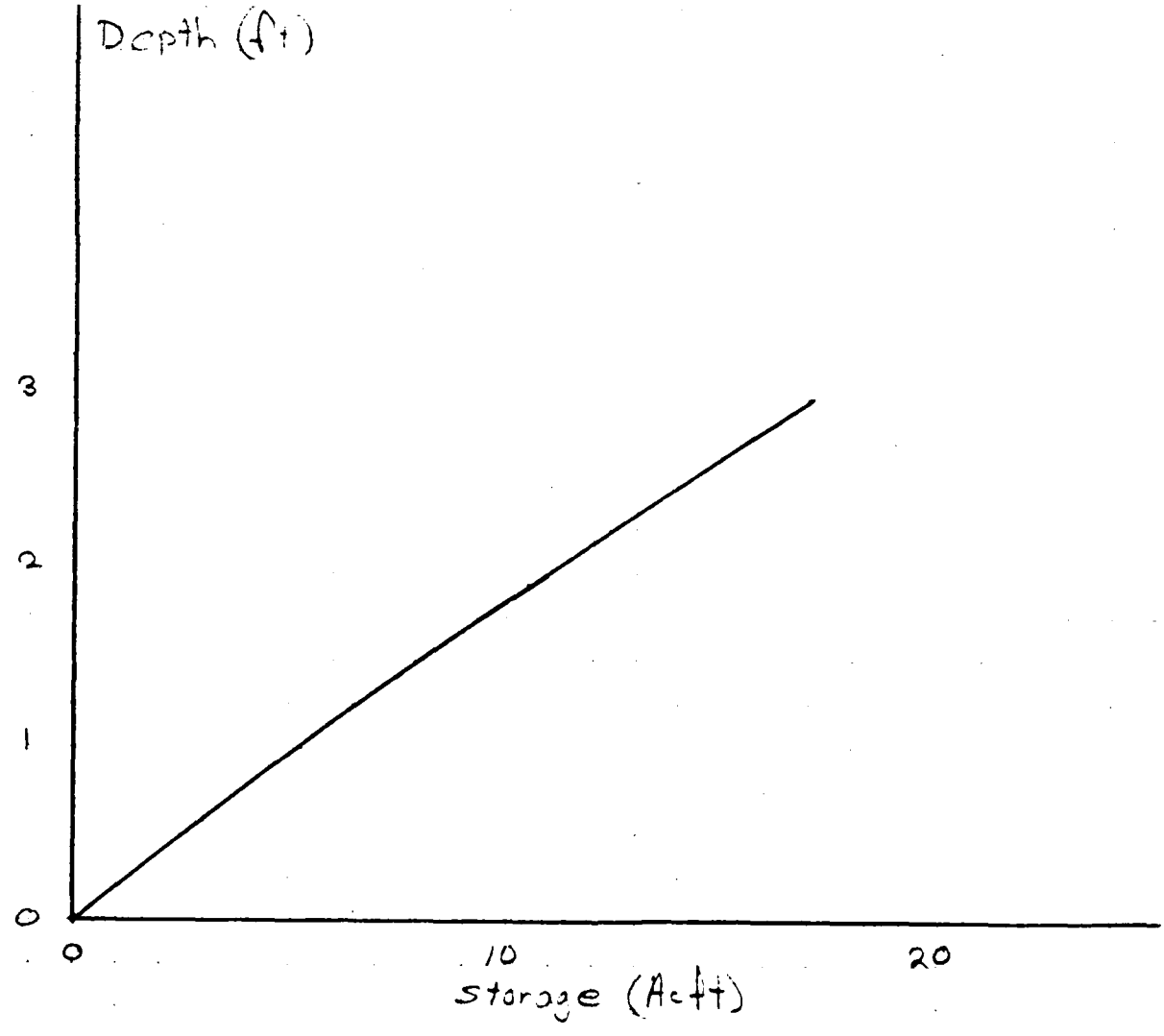
STORCH ENGINEERS
Engineers · Landscape Architects
Planners · Environmental Consultants

JOB Phase I Dam Inspection 4463
SHEET NO _____ OF _____
CALCULATED BY G.S. DATE 6/12/90
CHECKED BY _____ DATE _____

AREA - CAPACITY

Name of Dam: Mistress Ford Dam

ELEV	DEPTH	AREA	AVG. AREA	VOL	Σ VOL
100		5.0			0
	1.0		5.25	5.25	
101		5.5			5.25
	1.0		5.75	5.75	
102		6.0			11.0
	1.0		6.0	6.0	
103		6.0			17.0



STORCH ENGINEERS
Engineers - Landscape Architects
Planners - Environmental Consultants

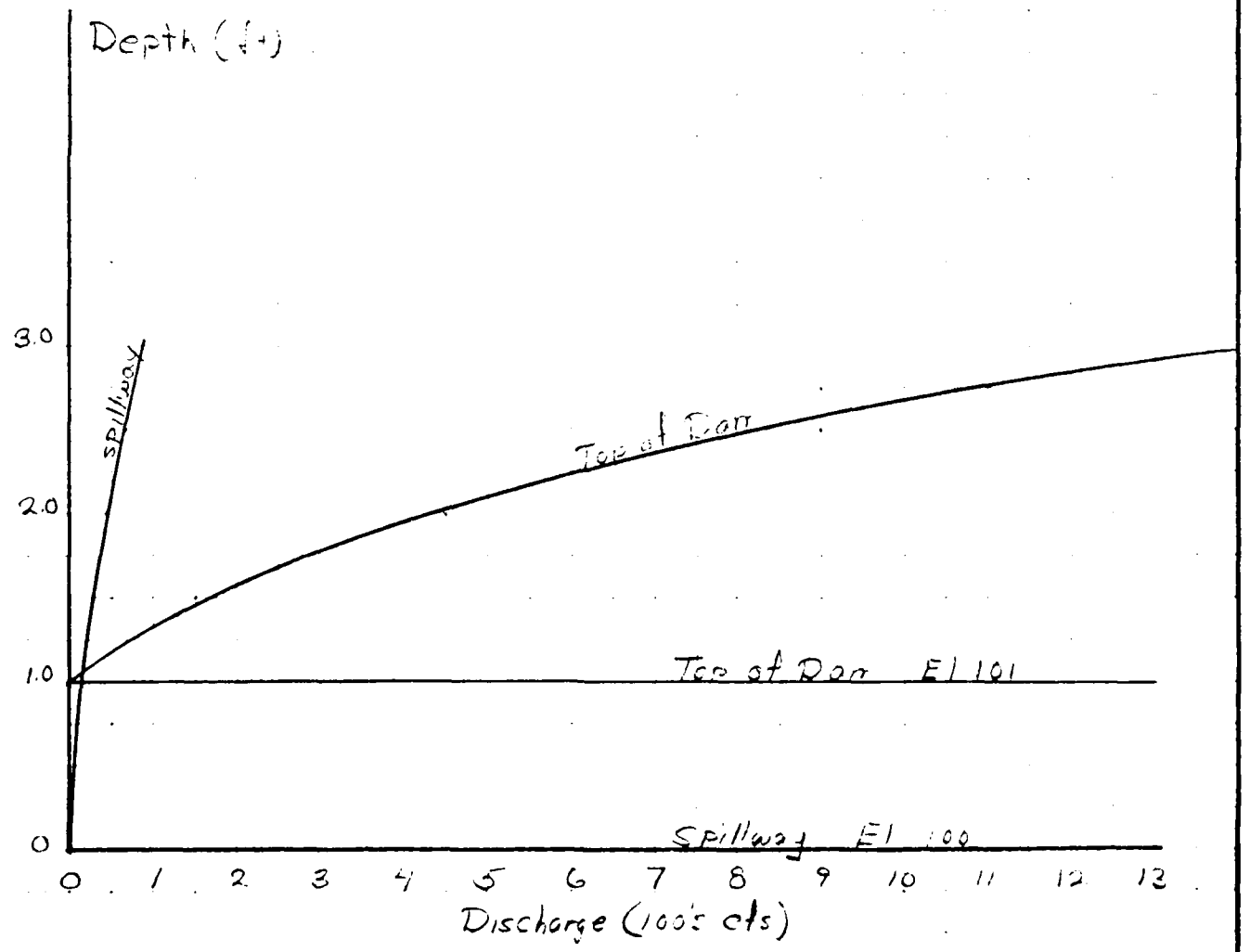
JOB Phase I Dam Inspection 4463
SHEET NO _____ OF _____
CALCULATED BY G.I.G. DATE 6/12/80
CHECKED BY _____ DATE _____

Stage Discharge

NAME OF DAM Morse Pond Dam

$Q = CLH^{3/2}$

	Spillway I				Spillway II				Dam				
Elev	C	L	H	Q	C	L	H	Q	C	L	H	Q	QT
100		5.0	0	0									0
100.5	2.61		.5	41.6									41.6
101	2.75		1.0	141							0		141
101.5	3.0		1.5	28					2.61	165	.5	150	175
102	3.03		2.0	43					2.75		1.0	450	493
102.5	3.31		2.5	65					3.0		1.5	900	965
103	3.32		3.0	86					3.03		2.0	1400	1486



STORCH ENGINEERS
Engineers · Landscape Architects
Planners · Environmental Consultants

JOB Phase I Dam Inspection - #446
SHEET NO _____ OF _____
CALCULATED BY K.J.P DATE _____
CHECKED BY G.G DATE _____

Downstream Hydrographs

"Rule of Thumb" Guidance for Estimating Downstream Failure Hydrographs

NAME OF DAM Mother Bird Dam

Section I at Dam

1. $S = \frac{32.0}{}$ Acft
2. $Q_{P1} = 8/27\ W_b \sqrt{g}\ Y^{3/2} = 8/27\ (50)\sqrt{32.2}\ 18^{3/2} = 6420$ cfs
3. See Sections

Section II at

4a. $H_2 =$ 4.2' $A_2 =$ 1102 SF $L_2 =$ 400' $V_2 =$ 10.1

b. $Q_{P2} = Q_{P1}\ (1-V_2/S) =$ 4280 cfs

c. $H_2 =$ 3.7' $A_2 =$ 950 SF

$A_A =$ 975 SF $V_2 =$ 8.9

$Q_{P2} = 6420\ (1 - 8.9/32) = 4635$ cfs

Section III at

4a. $H_3 =$ 3.5' $A_3 =$ 850 SF $L_3 =$ 500 $V_3 =$ 9.76

b. $Q_{P3} = Q_{P2}\ (1-V_3/S) =$ 2676 cfs

c. $H_3 =$ 2.6' $A_3 =$ 760 SF

$A_A =$ 700 SF $V_3 =$ 8.0

$Q_{P3} = 4508(1 - 8.0/23.1) = 3030$ cfs

Section IV at

4a. $H_4 =$ 3.0' $A_4 =$ _____ $L_4 =$ _____ $V_4 =$ _____

b. $Q_{P4} = Q_{P3}(1-V_4/S) =$ _____ cfs

c. $H_4 =$ _____ $A_4 =$ _____

$A_A =$ _____ $V_4 =$ _____

$Q_{P4} =$

STORCH ENGINEERS/STORCH ASSOCIATES
Engineers - Landscape Architects
Planners - Environmental Consultants

JOB _____

SHEET NO _____ OF _____

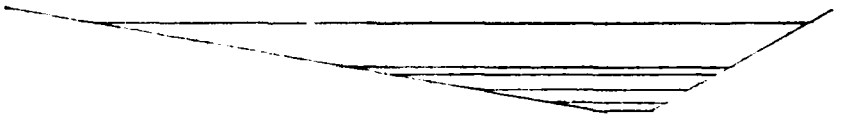
CALCULATED BY _____ DATE _____

CHECKED BY _____ DATE _____

SCALE _____

Section II 4,100

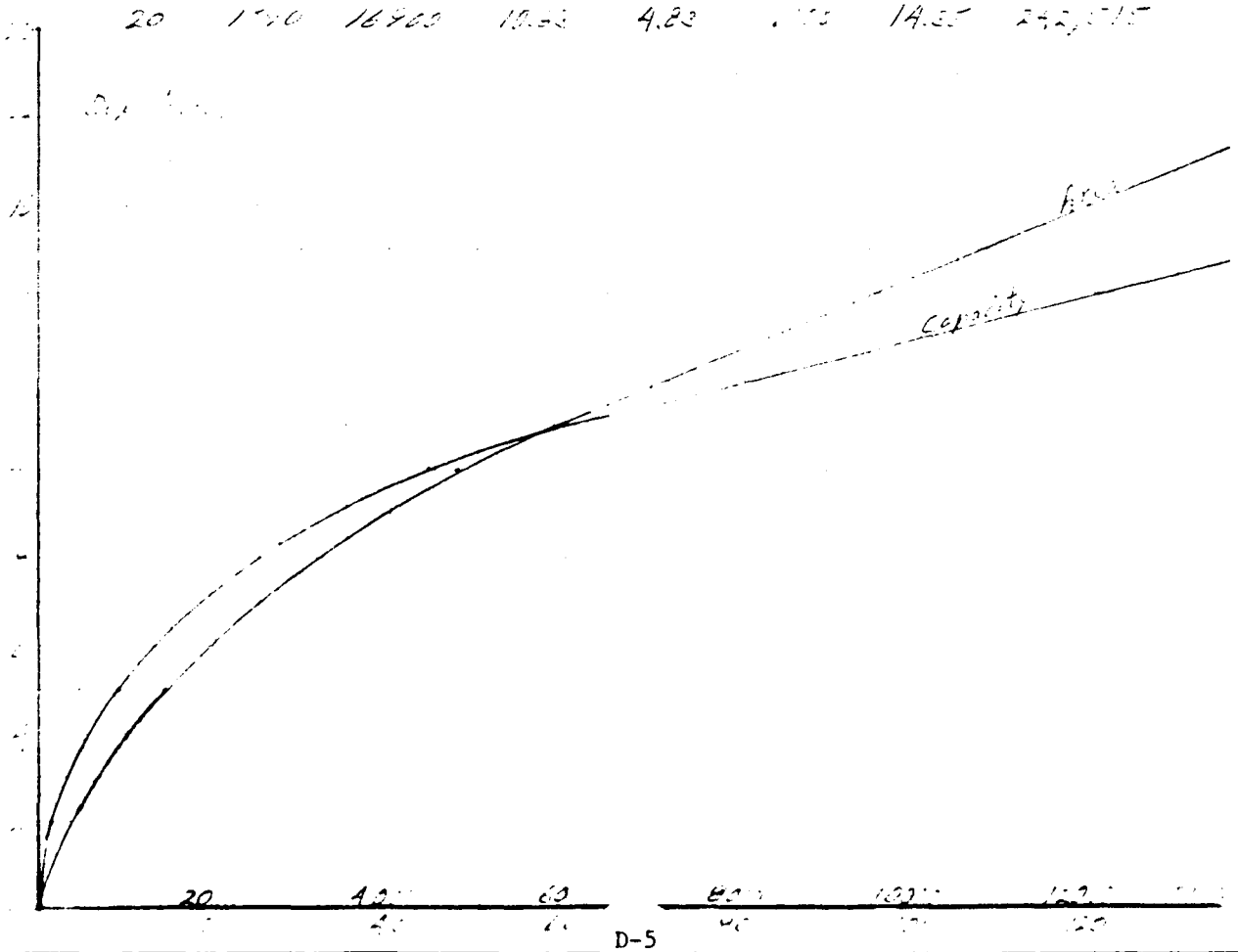
Section II 9+03



n = .035

S = 1.0 %

D	W	R	A	$R^{2/3}$	$S^{1/2}$	V	Q
2	250	500	1.41	1.25	.100	3.72	1202
5	470	1412	3.93	2.09	.100	6.21	8849
8	720	3240	4.56	2.75	.100	8.17	26,798
10	850	4775	5.79	3.17	.100	9.36	49,654
20	1720	16960	10.53	4.83	.100	14.35	242,575



STORCH ENGINEERS
Engineers · Landscape Architects
Planners · Environmental Consultants

JOB Phase I Dam Inspection - #4463
SHEET NO ______ OF ______
CALCULATED BY GJG DATE 7/30 80
CHECKED BY ECC DATE [illegible]

Downstream Hydrographs

"Rule of Thumb" Guidance for Estimating Downstream Failure Hydrographs

NAME OF DAM Mistress Pond Dam

Section I at Dam Water at Spillway Crest

1. S = 15 Acft
2. $Q_{P1} = 8/27\ W_b \sqrt{g}\ Y^{3/2}$ = 8/27 (50) √32.2 (15)^1.5 = 4883
3. See Sections

Section II at

4a. H_2 = 3.5' A_2 = 400 SF L_2 = 300' V_2 = 6.0 Acft
b. $Q_{P2} = Q_{P1}\ (1-V_2/S)$ = 2933 cfs
c. H_2 = 2.5' A_2 = 300 SF
A_A = 700 SF V_2 = 4.9 Acft

Q_{P2} = 4883(1 − 4.9/15) = 3320 cfs

Section III at

4a. H_3 = 3.1 A_3 = 650 SF L_3 = 300' V_3 = 4.5 Acft
b. $Q_{P3} = Q_{P2}\ (1-V_3/S)$ = 1550 cfs
c. H_3 = 2.3' A_3 = 400 SF
A_A = 525 SF V_3 = 3.6 Acft

Q_{P3} = 3320(1 − 3.6/10.1) = 2145 cfs

Section IV at

4a. H_4 = 2.6' A_4 = 500 SF L_4 = 300' V_4 = 3.44 Acft
b. $Q_{P4} = Q_{P3}(1-V_4/S)$ = 1025 cfs
c. H_4 = 1.8' A_4 = 350 SF
A_A = 425 SF V_4 = 2.9 Acft

Q_{P4} = 2145(1 − 2.9/6.54) = 1200 cfs

STORCH ENGINEERS
Engineers · Landscape Architects
Planners · Environmental Consultants

JOB Phase I Dam Inspection - #4463
SHEET NO _____ OF _____
CALCULATED BY G.C.S. DATE 7/20/80
CHECKED BY _____ DATE _____

Downstream Hydrographs (Continued)

Section V at

4a. H_5 = 4.5' A_5 = 12503F L_5 = 500' V_5 = 14.3 Acft

b. $Q_{P5} = Q_{P4}(1-V_5/S)$ = 2.2 cfs

c. H_5 = 4.0' A_5 = 10303F

A_A = 11253F V_5 = 12.9 Acft

Q_{P5} = 2035(1 − 12.9/40.2) = 1381 cfs

Section VI at

4a. H_6 = _____ A_6 = _____ L_6 = _____ V_6 = _____ Acft

b. $Q_{P6} = Q_{P5}(1-V_6/S)$ = _____ cfs

c. H_6 = _____ A_6 = _____

A_A = _____ V_6 = _____ Acft

Section VII at

4a. H_7 = _____ A_7 = _____ L_7 = _____ V_7 = _____ Acft

b. $Q_{P7} = Q_{P6}(1-V_7/S)$ = _____ cfs

c. H_7 = _____ A_7 = _____

A_A = _____ V_7 = _____ Acft

Q_{P7} =

APPENDIX E

INFORMATION AS CONTAINED IN

THE NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

(1) STATE	(2) IDENTITY NUMBER	(3) DIVISION	(4) STATE	(5) COUNTY	(6) CONGR DIST.	(7) STATE	(8) COUNTY	(9) CONGR DIST.	(10) NAME	(11) LATITUDE (NORTH)	(12) LONGITUDE (WEST)	(13) REPORT DATE DAY	MO	YR
CT	54	NED	CT	001	04				MATHERS POND DAM	4106.5	7328.5	17	SEP	80

(14) POPULAR NAME	(15) NAME OF IMPOUNDMENT
	MATHERS POND

(15) REGION	(16) BASIN	(17) RIVER OR STREAM	(18) NEAREST DOWNSTREAM CITY–TOWN–VILLAGE	(19) DIST FROM DAM (MI.)	(20) POPULATION
01	10	TR GOODRIVES RIVER	DARIEN	2	20900

(21) TYPE OF DAM	(22) YEAR COMPLETED	(23) PURPOSES	(24) STRUCTURAL HEIGHT (FT.)	(25) HYDRAULIC HEIGHT (FT.)	(26) IMPOUNDING CAPACITIES MAXIMUM (ACRE-FT.)	(27) NORMAL (ACRE-FT.)	DIST	OWN	FED R	PRV/FED	SCS A	VER/DATE
RECTPG	1921	P	18	18	32	10	NED	N	N	N	N	

(28) REMARKS

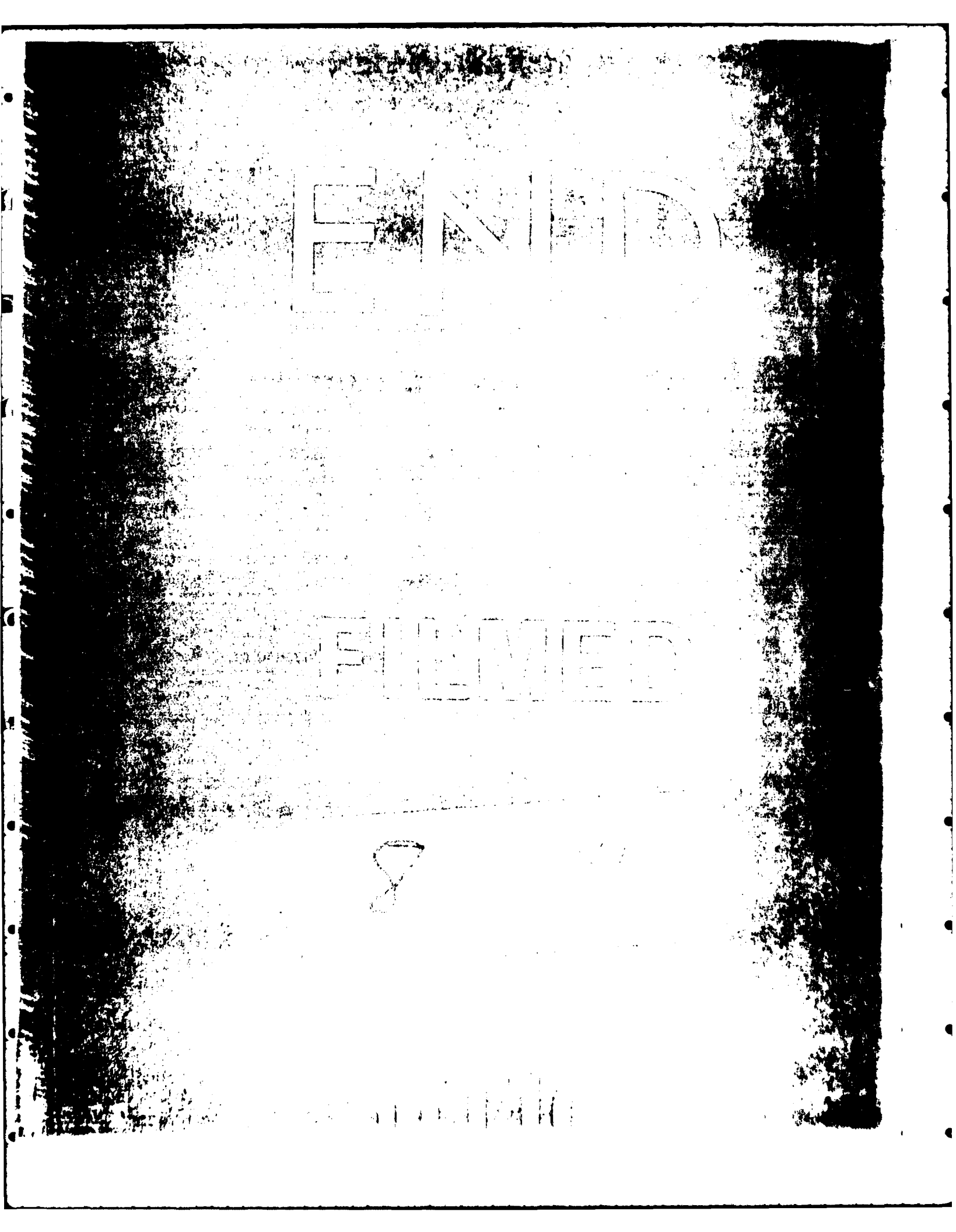
(29) D/S HAS	(30) SPILLWAY CREST LENGTH	(31) TYPE	(32) WIDTH (FT.)	(33) MAXIMUM DISCHARGE (FT.)	(34) VOLUME OF DAM (CY)	(35) POWER CAPACITY INSTALLED (MW)	(36) PROPOSED (MW)	(37) NAVIGATION LOCKS NO.	(38) LENGTH (FT.)	(39) WIDTH (FT.)	(40) LENGTH (FT.)	(41) WIDTH (FT.)	(42) LENGTH (FT.)	(43) WIDTH (FT.)	(44) LENGTH (FT.)	(45) WIDTH (FT.)
Y	280		170	1486												

(46) OWNER	(47) ENGINEERING BY	(48) CONSTRUCTION BY
DAVID R ARNOLD	MAJ WM A WELCH	UNKNOWN

(49) REGULATORY AGENCY			
DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
NONE	NONE	CT DEP	CT DEP

(50) INSPECTION BY	(51) INSPECTION DATE DAY	MO	YR	(52) AUTHORITY FOR INSPECTION
STORCH ENGINEERS	30	MAY	80	PL 92-367

(53) REMARKS


END
FILMED